Raymarine®

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RAYMARINE

Raymarine®

| RADAR | NAVIGATION AIDS | INSTRUMENTS | AUTOPILOTS | SATELLITE TV | COMMUNICATIONS | FISHFINDERS | SOFTWARE | SYSTEMS |

Give yourself the Raymarine Advantage

Smart on the inside, simple on the outside: that's the Raymarine advantage.

Our products combine industry-leading technology with intuitive design, to deliver a range that's ideally suited to the needs of today's boater - whether it's a round-the-world race or a weekend fishing trip.

We specialise in marine electronics. Backed up with years of research and customer feedback, this focus has allowed us to create a range that offers high performance and reliability, as well as exceptional ease of use: making sure you get the information you need quickly and easily.

And, behind it all, there's Raymarine's service commitment: outstanding warranty and technical support – and a worldwide network, providing total peace of mind wherever your boating takes you.

Welcome to Raymarine. Enjoy the advantage.

▼ STEP 1. FIND THE RIGHT PRODUCT

SUGGESTED SYSTEMS
02 Every boat owner has different needs and priorities – so how do you choose a system that's right for you? If you're not sure where to start, try the suggestions on these pages.

NETWORK MULTIFUNCTION SOLUTIONS
12 E Series: industry-leading networked solution, with live video feed, remote stations and multifunction display.
20 SeaTalk² Navigation Keyboard and Cameras.

G MARINE MONITORS
18 17" and 19" Marine Monitors.

SINGLE-STATION MULTIFUNCTION SOLUTIONS
22 C Series: single-station display, combining radar, fishfinder and chartplotter.

WIRELESS MAN OVERBOARD SYSTEM
30 LifeTag Wireless Man Overboard System.

RADAR SCANNERS AND GPS
32 Radome and Open Array Radar Scanners plus RayStar125 SDGPS Antenna.

HD DIGITAL FISHFINDERS
34 Cut out the clutter and get a much clearer picture of what's going on beneath the surface, with Raymarine's innovative HD Digital technology.
38 A65 Dualfunction Fishfinder Chartplotter.
41 DS500X and DS600X Fishfinders.

CHARTPLOTTERS & NAVIGATION
26 Raytech Navigation software: plotting on your laptop.
38 A65 Dualfunction Fishfinder Chartplotter.
40 A Series Standalone Chartplotters.

SATELLITE TV ANTENNAS
28 45STV Satellite TV Antenna System.
29 60STV Satellite TV Antenna System.

INSTRUMENTS
42 ST290 Premium Instruments.
45 ST60+ Mid-range Instruments.
48 ST40 Entry level Instruments.

AUTOPILOTS
51 Cockpit Mounted for Sailboats.
54 Inboard for Sail and Powerboats.
62 Wireless Remote Controls.
64 S1000 inboard, IPS and Verado Autopilots.

MARINE COMMUNICATIONS
66 VHF Radios.
68 Loudhailer.

▼ STEP 2. CHECK THE SPECIFICATIONS

70 Once you've found the product you're interested in, turn to this section for the full technical low-down. Performance, features, dimensions, compatibility: whatever you need to know, you'll find it here.
If there are any questions you still need answered, your dealer should be able to help. Alternatively, visit **www.raymarine.com/support** – or call +44 (0)23 9271 4713, to speak to one of our experienced engineering specialists.

▼ STEP 3. CONTACT YOUR DEALER

Raymarine products are available through a worldwide network of specialist dealers. To find the dealer nearest you, just visit our website at **www.raymarine.com** and click **'how to buy'**.

Raymarine

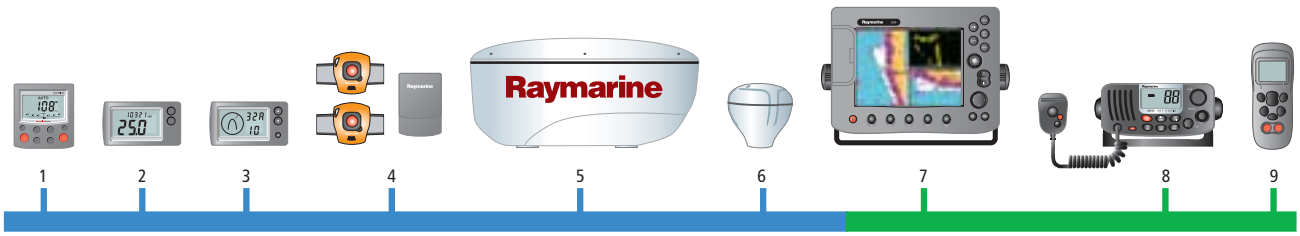
Suggested Systems for Sail and Power

Need a marine electronics system but don't know where to start?

Whether you're fitting out a 17' fishing boat or a 100' cruiser, Raymarine has the equipment you need: single screen solutions or networked systems, with the performance and ease of use you expect from Raymarine.

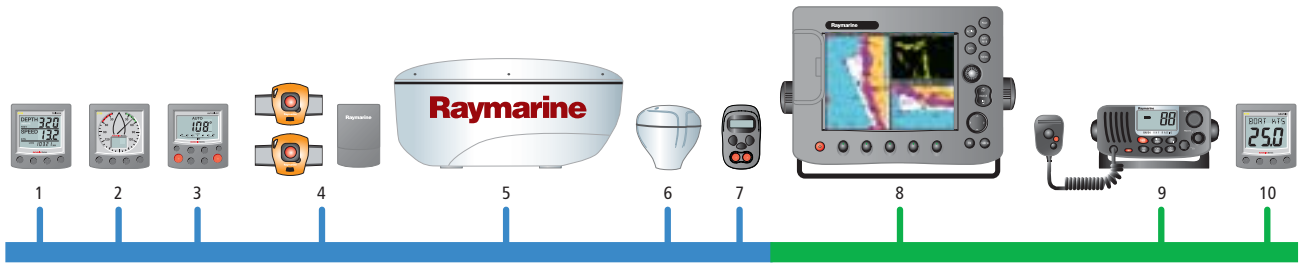
Over the next seven pages, you'll find examples of marine electronics systems for powerboats and sailboats of various sizes. It's not a hard and fast guide – every boat has its own particular needs – but it's an excellent starting point. So please use these pages as a reference and contact your local dealer for more detailed advice about specifications. You can find your nearest dealer online at **www.raymarine.com.**

SAILBOATS TO 28' (8.6m)



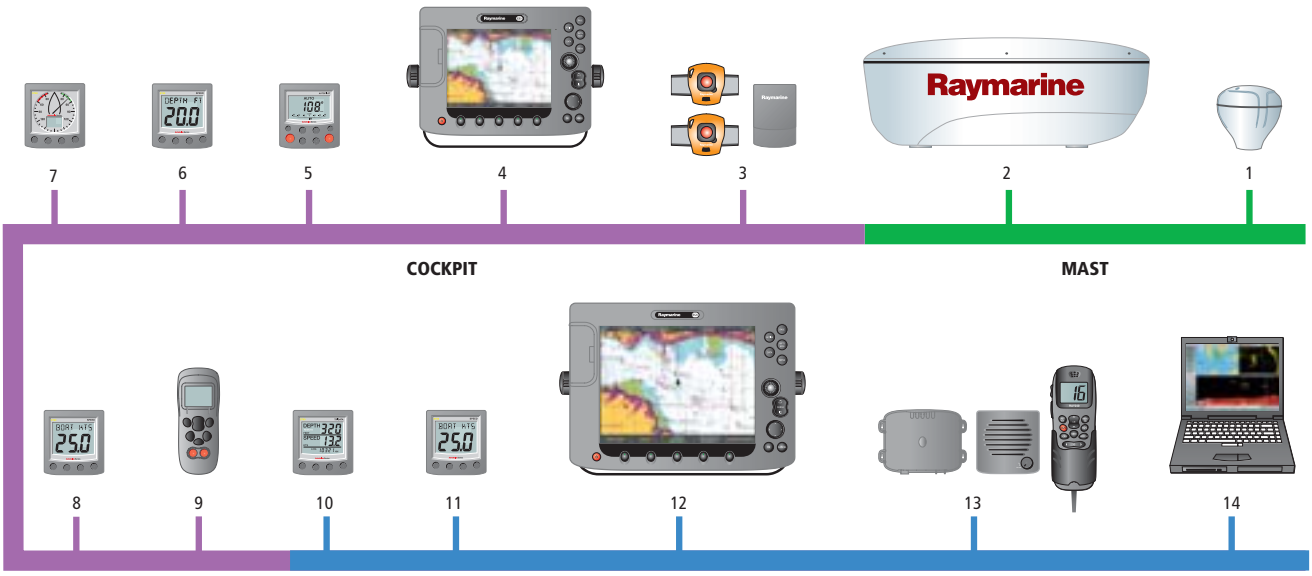
1. ST6002 Autopilot Control Head
2. ST40™ Bidata™ Display
3. ST40 Wind Display
4. LifeTag™ System (up to 16 tags)
5. 2kW Radome Scanner
6. Raystar™125 SDGPS Antenna
7. C80 Multifunction Display
8. Ray54E VHF Radio
9. SmartController Wireless Remote

SAILBOATS TO 35' (10.8m)



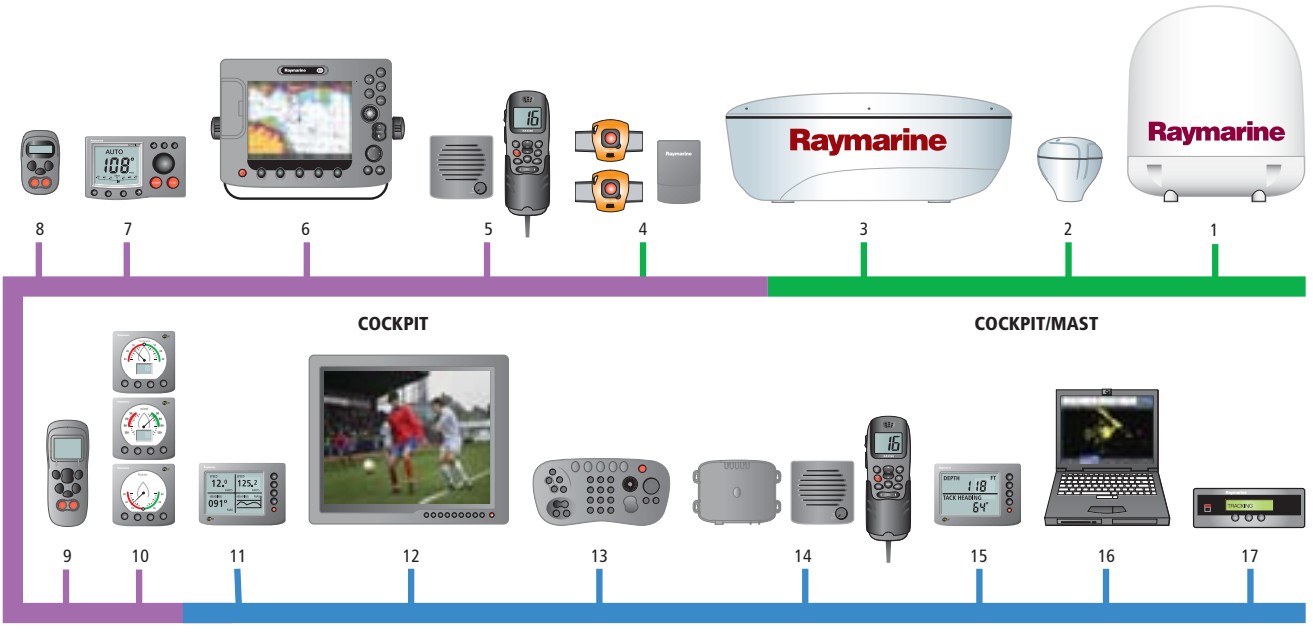
1. ST60+™ Tridata™ Display
2. ST60+ Wind Display
3. ST6002 Autopilot Control Head
4. LifeTag System (up to 16 tags)
5. 2kW Radome Scanner
6. Raystar125 SDGPS Antenna
7. S100 Wireless Autopilot Remote
8. C120 Multifunction Display
9. Ray54E VHF Radio
10. ST60+ Graphic Display

SAILBOATS TO 50' (15.4m)

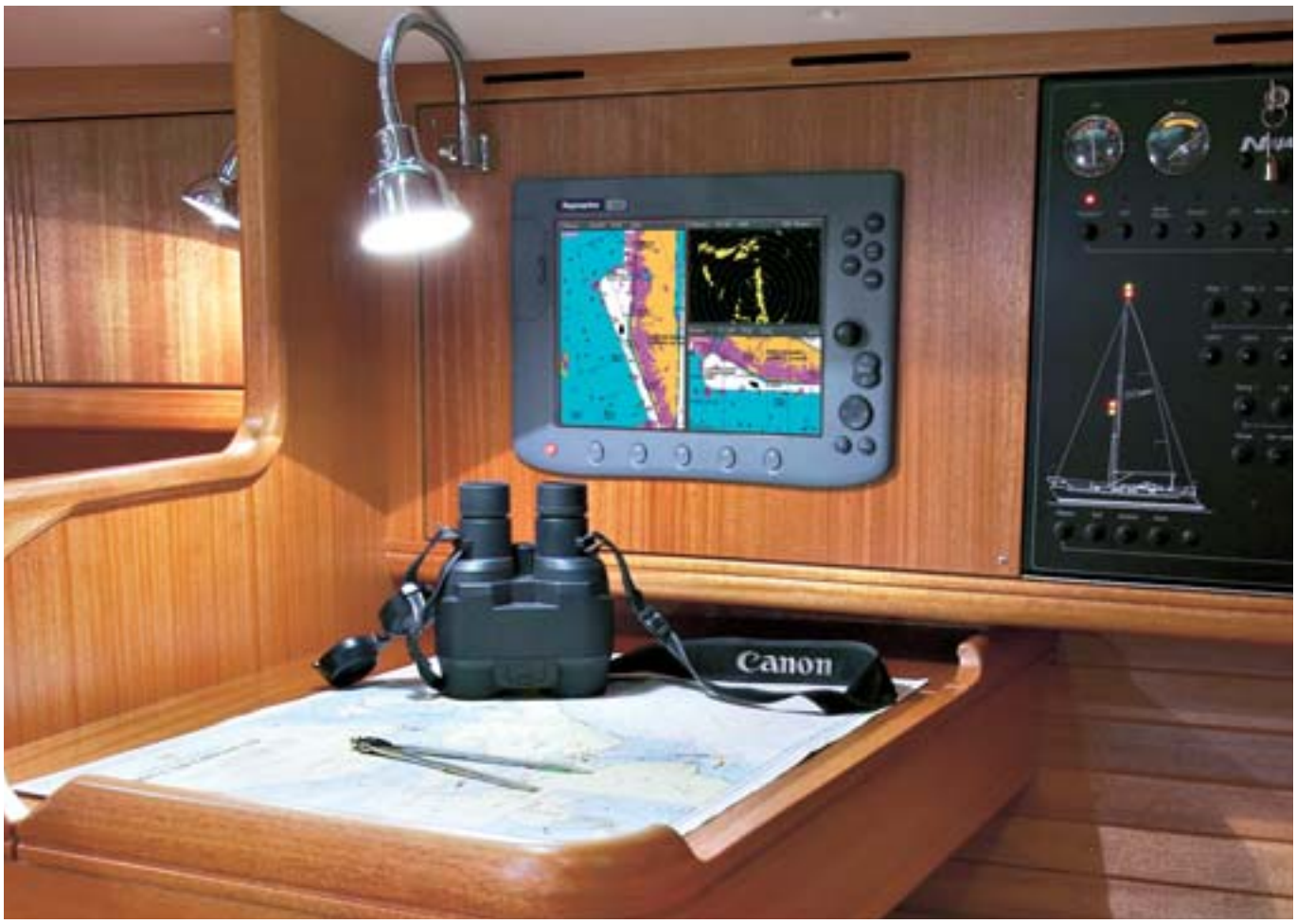


1. Raystar125 SDGPS Antenna
2. 4kW Radome Scanner
3. LifeTag System (up to 16 tags)
4. E80 Multifunction Network Display
5. ST6002 Autopilot Control Head
6. ST60+ Depth Display
7. ST60+ Wind Display
8. ST60+ Speed Display
9. SmartContoller Wireless Remote
10. ST60+ Tridata Display
11. ST60+ Graphic Display
12. E120 Multifunction Network Display
13. Ray240E VHF Radio
14. RayTech Software running on a PC

SAILBOATS OVER 50' (15.4m)



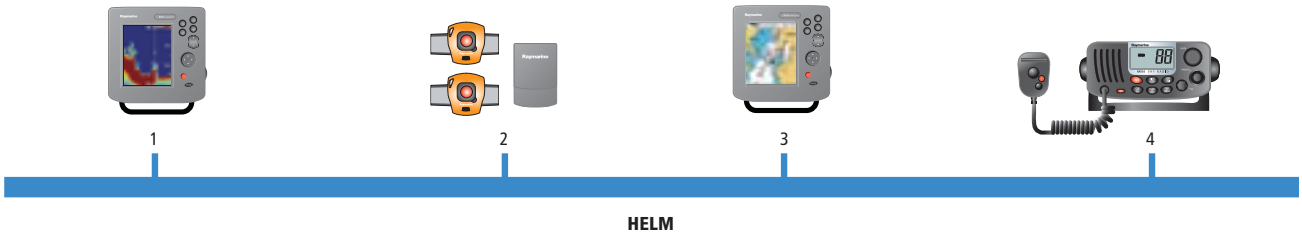
1. 60STV Satellite Television Antenna
2. Raystar125 SDGPS Antenna
3. 4kW Radome Scanner
4. LifeTag System (up to16 tags)
5. Ray240E VHF Handset and External Speaker
6. E80/E120 Multifunction Network Display
7. ST8002 Autopilot Control Head
8. S100 Wireless Autopilot Remote
9. SmartController Wireless Remote
10. ST290 Analogue Displays
11. ST290 Graphic Display
12. G170 17" Marine Monitor
13. SeaTalk^2 Keyboard
14. Ray240E VHF Radio
15. ST290 Data Display
16. RayTech Software running on a PC
17. 60STV Satellite TV Antenna Control Unit


Canon

Raymarine
A65
North-Up
Relative Motion
ENTER
CANCEL
RANGE
PAGE
ACTIVE
WPTS
MOB
DATA
MENU
SAVE?

GM999Q
YAMAHA

POWER TO 28' (8.6m)



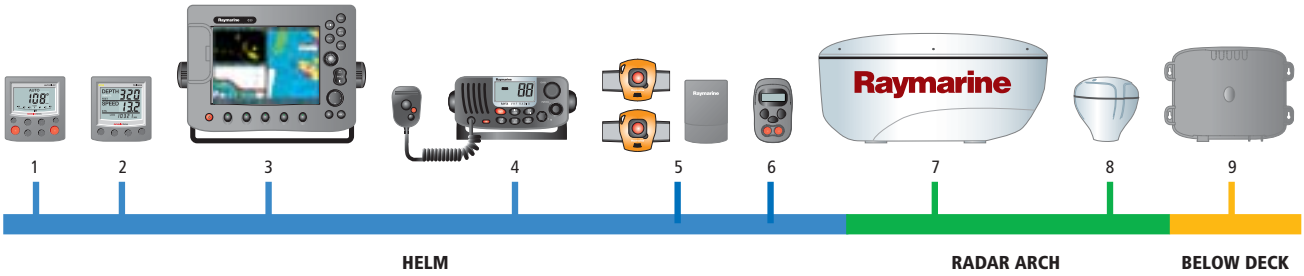
1. DS600X Fishfinder
2. LifeTag System (op til 16 tags)
3. Raychart 435i
4. Ray54E VHF Radio

OR

POWER TO 28' (8.6m)

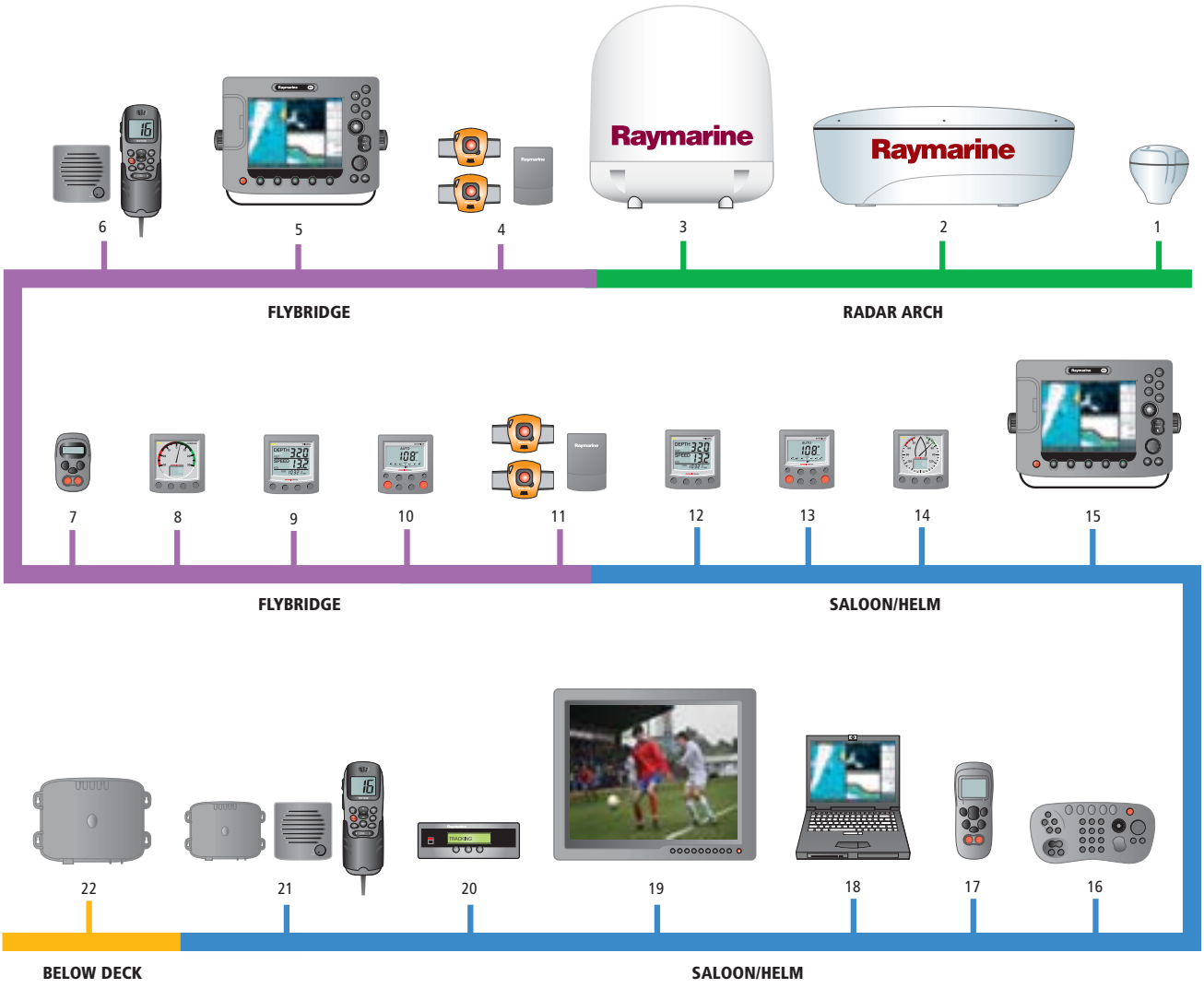
1. A65 Dualfunction Chartplotter Fishfinder with GPS
2. LifeTag System (up to 16 tags)
3. Ray54E VHF Radio
4. DSM25 HD Digital Fishfinder Module

POWER TO 35' (10.8m)



1. ST6002 Autopilot Control Head
2. ST60+ Tridata Display
3. C80 Multifunction Display
4. Ray54E VHF radio
5. LifeTag System (up to 16 tags)
6. S100 Wireless Autopilot Remote
7. 2kW Radome Scanner
8. Raystar125 SDGPS Antenna
9. DSM300 HD Digital Fishfinder Module

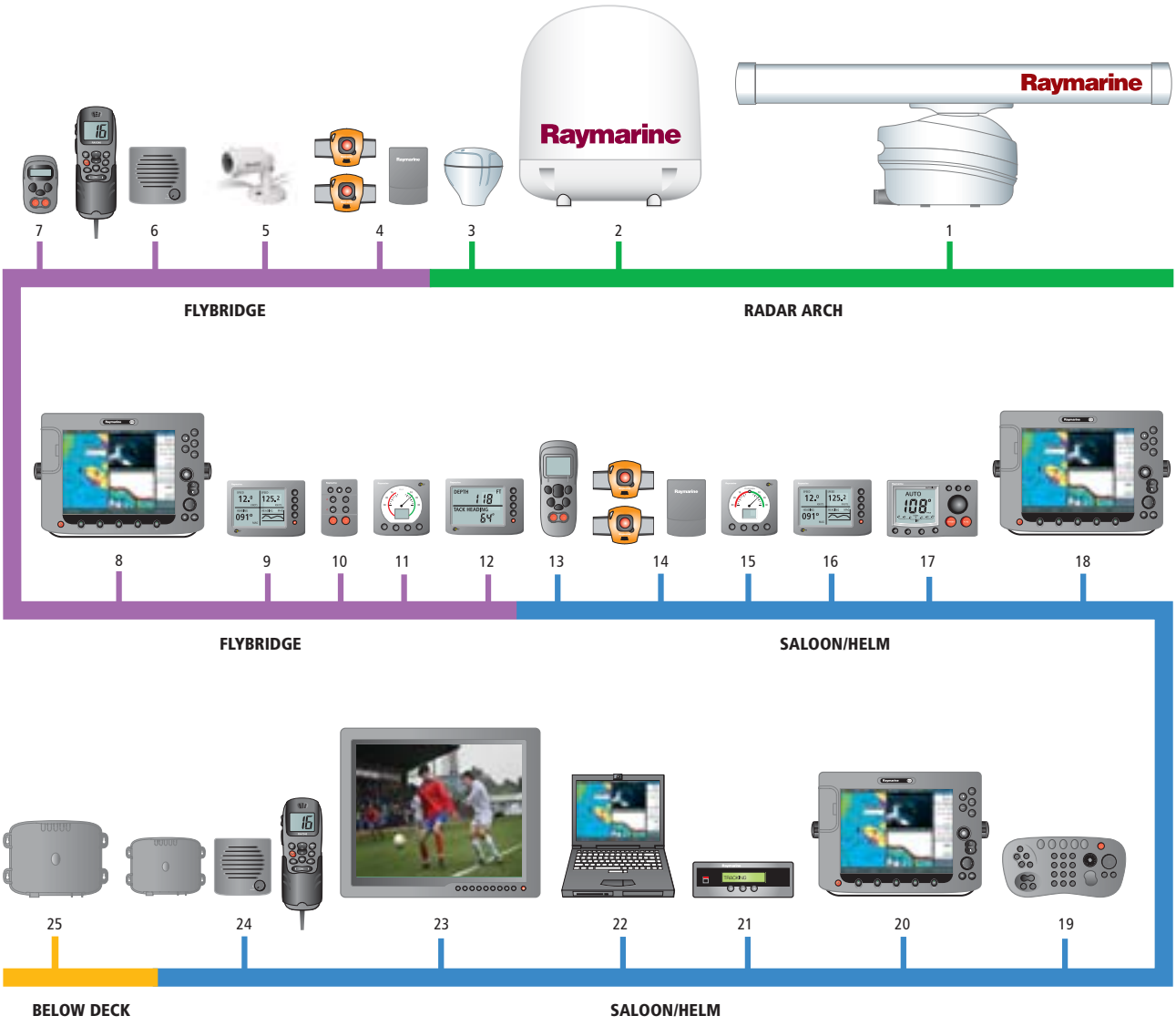
POWER 35' TO 50' (10.8 – 15.4m)



1. Raystar125 SDGPS Antenna
2. 4kW Radome Scanner
3. 45STV Satellite TV Antenna System
4. LifeTag System (up to 16 tags)
5. E80 Multifunction Network Display
6. Ray240E VHF Remote Handset and External Speaker
7. S100 Wireless Autopilot Remote
8. ST60+ Compass
9. ST60+ Tridata
10. ST6002 Autopilot Control Head
11. LifeTag System (up to 16 tags)
12. ST60+ Tridata
13. ST6002 Autopilot Control Head
14. ST60+ Wind
15. E80 Multifunction Network Display
16. SeaTalk^2 Keyboard
17. SmartController Wireless Remote
18. RayTech Software Running on a PC
19. G170 17" Marine Monitor
20. 45STV Satellite TV Antenna Control Unit
21. Ray240E VHF Radio and External Speaker
22. DSM300 HD Digital Module

AZIMUT

POWER OVER 50' (15.4m)



1. 4kW or 10kW Open Array Scanner
2. 60STV Satellite TV Antenna System
3. Raystar125 SDGPS Antenna
4. LifeTag System (up to 16 tags)
5. CAM100 Video Camera
6. Ray240E VHF with Remote Handset and External Speaker
7. S100 Wireless Autopilot Remote
8. E120 Multifunction Network Display
9. ST290 Graphic
10. ST290 Pilot Keypad
11. ST290 Wind
12. ST290 Data
13. SmartController Wireless Remote
14. LifeTag System (up to16 tags)
15. ST290 Compass
16. ST290 Graphic
17. ST8002 Autopilot Control Head
18. E120 Multifunction Network Display
19. SeaTalk^2 Keyboard Display
20. E120 Multifunction Network
21. 60STV Satellite TV Antenna Control Unit
22. RayTech Software running on a PC
23. G190 19" Marine Monitor
24. Ray240E VHF Radio
25. DSM300 HD Digital Module

NMEA AWARDS 2006 BEST NAVIGATION PRODUCT E SERIES

NAVIONICS Platinum MULTI-DIMENSIONAL CHARTS

SeaTalkhs High Speed Network

Sunlight Viewable Colour Display

GOTO

Page 70 for product specifications

E SERIES Network Displays

E Series Network Displays – get the whole picture

Raymarine's award-winning E Series gives you everything you need from a marine display in a single multifunction package. Chartplotter, Fishfinder, Radar, Instrument data, Engine data – even live video feeds and LifeTag 'man overboard' tracking. All at your fingertips instantly, thanks to Raymarine's super-fast SeaTalk® networking software.

Add in powerful 3D graphics, unbeatable functionality and a high-bright screen you can view even in bright sunlight, and you really have got the whole picture.

Radar

HD Digital fishfinder

Chartplotter/GPS

Video/Entertainment

AIS or Navtex data input support

LifeTag wireless MOB system

General Features

- Chartplotter, fishfinder, radar, video, instrument data, engine data.
- Single, dual or multi-station operation.
- Connect remote cameras or on-board video entertainment sources.
- Access engine instrument data.
- Navtex weather data input support.
- AIS data input support.
- Engine monitoring support for NMEA2000 and J1939 compatible engines.
- Customisable instrument and data screens, including a Compass Rose and sea temperature graph.

Display Features

- High-bright direct sunshine viewable 256 colour enhanced high resolution TFT displays.
- Ultra-fast screen redraw and enhanced graphics.
- Wide viewing angle.
- Prismatic light enhancing screen.
- Integrated anti-reflective screen filter.

Network Features

- SeaTalk^{hs} High Speed Networking – 10 times faster than leading marine networks.
- Instantly transfer radar, chartplotter, fishfinder and navigation functions between E Series displays.
- Single, dual or multi-station configurations.
- Simple setup – no hassle 'plug and play' network, no confusing protocols or IT professional required.
- Network up to 8 network devices/displays with 8 port network switch.
- Easy autopilot and instrument integration with Raymarine SeaTalk and SeaTalk^{2}.
- On screen DSC VHF Position Reports.
- SeaTalk, SeaTalk^{2}, SeaTalk^{hs}, NMEA0183, NMEA2000 compatibility.
- RayTech V6 and SeaTalk^{hs} plug/play networking with your PC.
- Compatible with Raymarine LifeTag wireless man-overboard system.

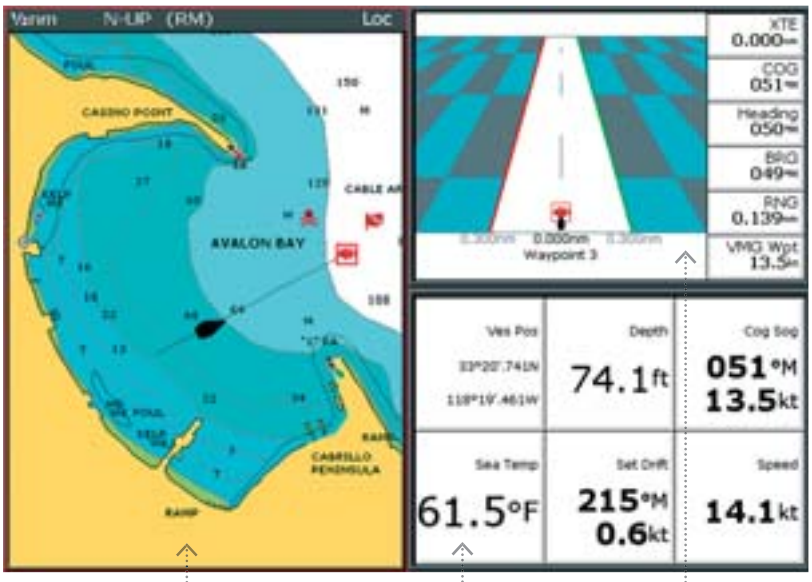
Chartplotter

- Relative, True and Auto-ranging motion modes – view your chart the way you like it.
- Head Up/North Up/Course Up chart rotation modes.
- Screen offset for maximum 'look ahead' chart display.
- Waypoint navigation and multiple waypoint overlay.
- 1200 waypoints with 16-character name.
- 150 routes with 50 waypoints per route.
- 10 track memories with 1000 points per track.
- SmartRoute™ converts tracks into waypoints and waypoints into a route.
- Uses the Raystar125 GPS sensor (available separately) for Satellite Differential GPS accuracy.

Cartography

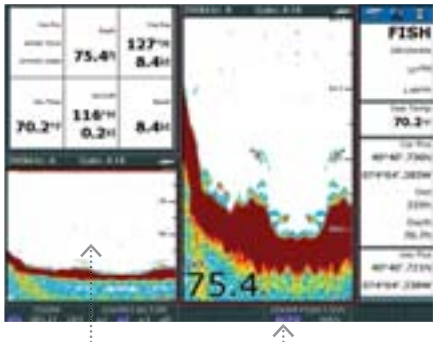
- Navionics cartography on compact flash memory cards.
- 'Paper like' appearance with uncluttered charts on every range scale.
- Navionics Gold, Gold Plus, Platinum.

Chartplotter: E Series can display chart images full-screen or in windows.



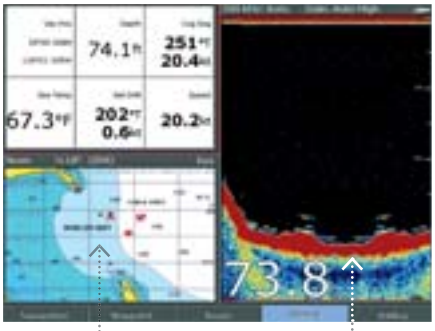
Zoomed window | Navigation data window | Rolling road window

Fishfinder zoom



Zoomed fishfinder image | Fishfinder image

Fishfinder split screen



Navigation data and chartplotter screen | Fishfinder image

DSM300 HD Digital fishfinder module*
This SeaTalk network compatible sounder module delivers high definition digital fishfinding to every display on the network.

* Available as an optional extra – see page 37.

HD DIGITAL

Fishfinder

- HD Digital fishfinder technology.
- Uses DSM300 Digital Sounder Module.
- 600 or 1000 watt high performance and ultra high performance transducer options.
- A-scope real time sonar display.
- Zoom into any portion of the water column for incredible detail.
- Auto Adaptive Digital transmitter/receiver.
- Dual Frequency 200/50 kHz operation.

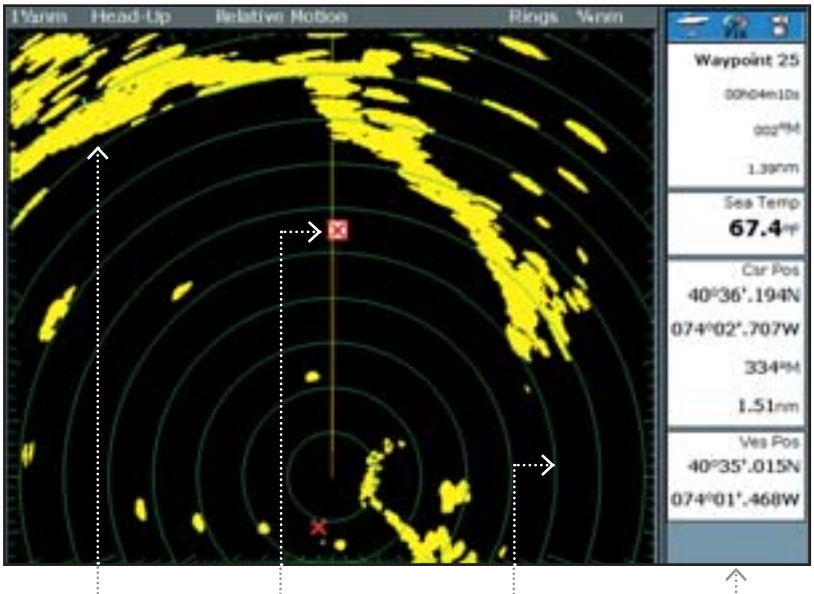
HD Digital

This revolutionary technology will change your fishing world, delivering sparkling clarity and fine detail that you won't find on conventional fishfinders.

For a brief introduction to HD Digital, go to page 34.

For detailed information on the benefits of HD Digital technology, please visit our website **www.raymarine.com**

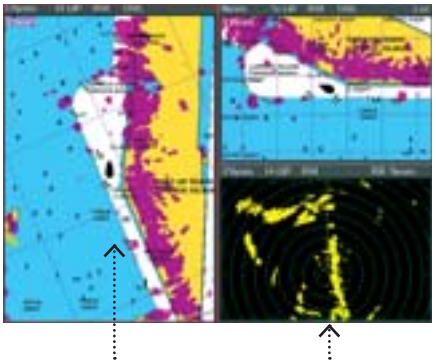
Radar: Waypoint information overlaid onto the radar image.



Radar

- Radar/chart overlay.
- MARPA (Mini Automatic Radar Plotting Aid) target tracking (using fast heading input/G (gyro) course computer).
- Overlay multiple waypoints on the radar and create waypoints directly on the radar display.
- Relative or True Motion.
- Head up, Course up or North up mode.
- Auto GST™ automatic control of gain, sea clutter and tune.
- Radome or open array antenna options.
- 72nm max range (dependent on scanner type, position and conditions).
- Power saving Timed Transmit mode.

Radar/chart overlay



Page 70 for product specifications

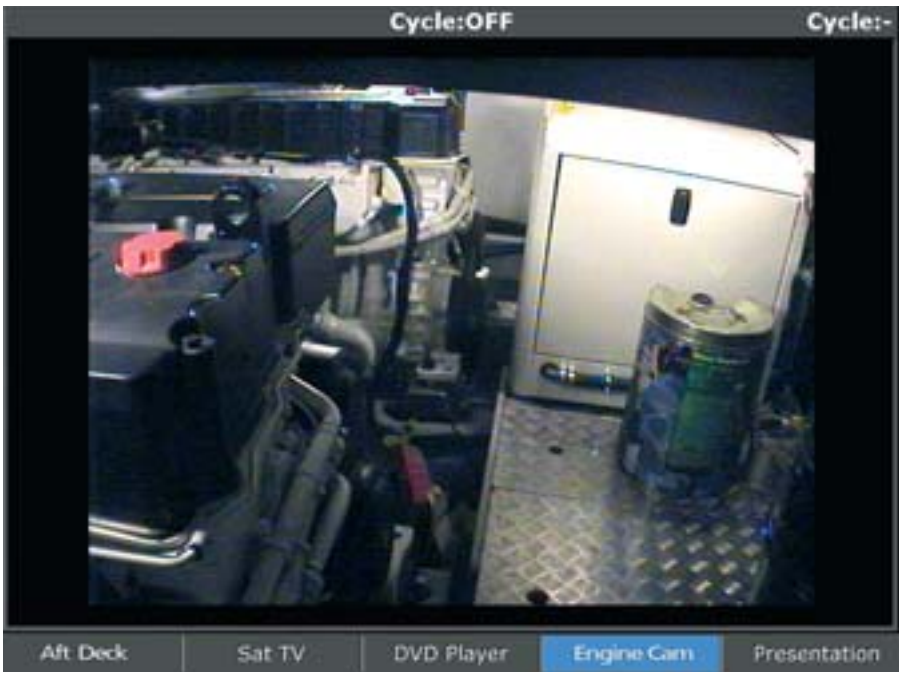
Navionics Platinum 'panoramic view'

Port information overlay

Video

- Video inputs (composite x4 or S-video x2) for viewing remote cameras or on board entertainment. Video input possibilities: underwater and docking cameras, engine room monitoring, DVD, games consoles and satellite TV.
- Video output port for connection to remote PC or flat screen monitors.
- CAM100 day and night vision camera.

CAM100 DAY & NIGHT VIDEO CAMERA
For more information on the Raymarine CAM100 day & night vision camera, please goto **www.raymarine.com.**



Video
Engine room monitoring via remote video camera.

Engine Data

- Customisable engine instrument data / engine monitoring (subject to compatability).
- Data includes: tachometer, voltage, oil pressure, fuel level, fuel consumption and coolant temperature.
- Supports single and dual engines.
- Choose from 5 engine data display combinations.

AIS or Navtex Support

- AIS data input support.
- Navtex weather data input support.

Instrument Data

- Raymarine's SeaTalk and SeaTalk^2 protocols for Raymarine integration.
- Seamless integration with Raymarine's instruments and autopilot systems.
- NMEA 0183 and NMEA2000.
- Using the page and window customisation controls, instrument data can be repeated either in full screen or within a window.

TECHTIP

RayTech Planner.
A 'light' version of RayTechRNS 6.0 software for planning and transferring waypoints and routes, between your PC and Raymarine chartplotters and multifunction displays is available as a **FREE** download on our website **www.raymarine.com.**

Latest Software Upgrades
The latest software for Raymarine multifunction displays is always available for download on **www.raymarine.com**

Additional E Series display networked using SeaTalk^{hs}

DSM300 HD Digital echo sounder module* networked using SeaTalk^{hs}

Additional E Series display networked using SeaTalk^{hs}

SeaTalk^{hs} switch connects 3 or more E Series displays

SeaTalk^{hs}

SeaTalk

SeaTalk instruments

SeaTalk

RayStar125 SDGPS

Radar antenna

LifeTag wireless MOB system

SeaTalk^{2}

SeaTalk^{2} keyboard

S Video Composite

Video/DVD input (S Video / Composite)

VGA

G Marine Monitor

Optional Alpha Numeric Keypad
For easy waypoint, route and text editing. SeaTalk compatible. Designed for low-profile flush-mounting.

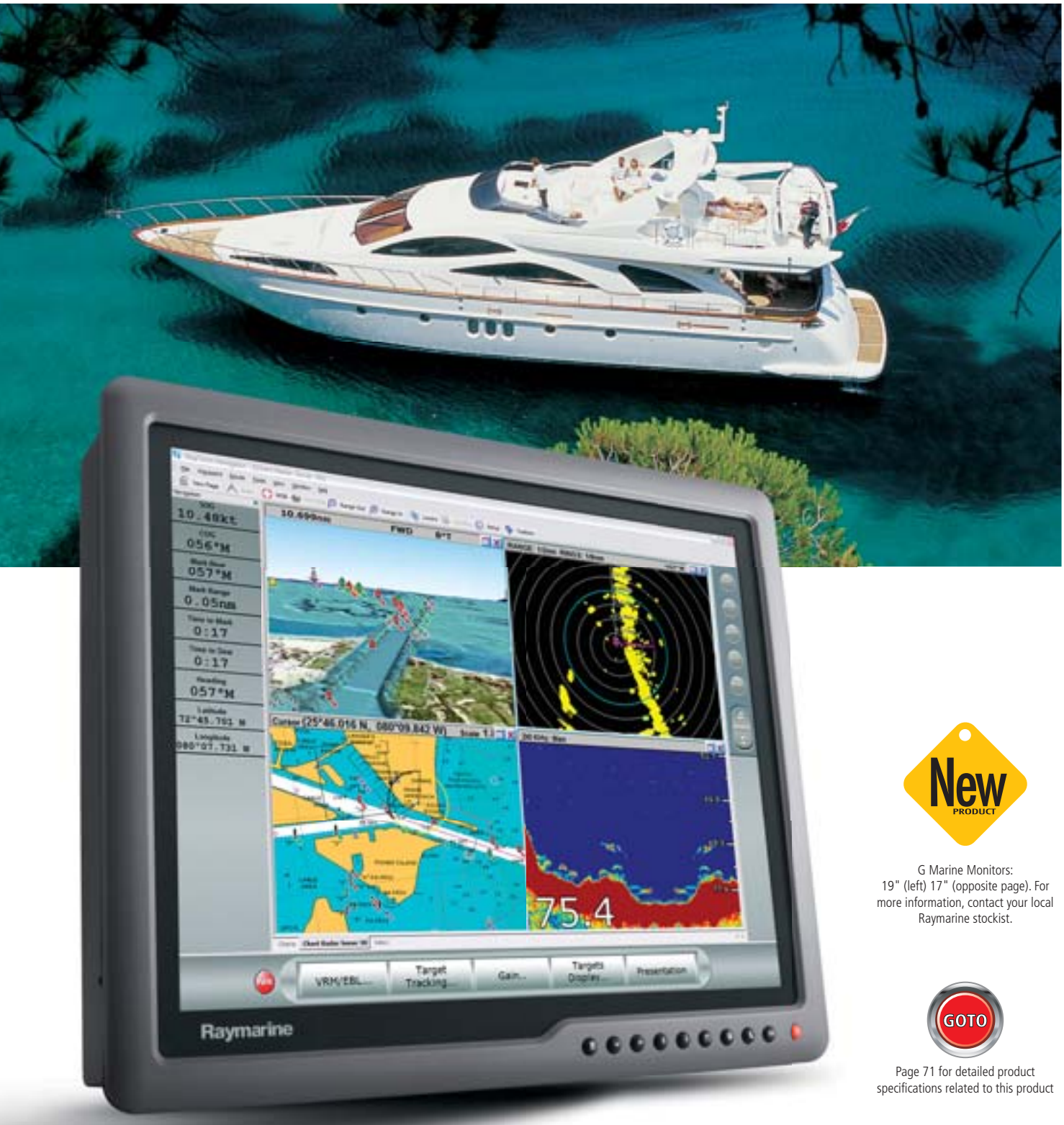
17" and 19" G Marine Monitors

Overview
The new G170 and G190 marine displays offer unmatched performance and versatility. Engineered to meet the integration demands of the modern vessel, the G170 and G190 feature multiple input capabilities, rugged aluminium construction and Raymarine's world renowned, ultra bright sunlight viewable display technology.

E Series Remote Station
Combine the G170 or G190 with a Raymarine E Series Display and an E Series remote keyboard to create an extra large E Series remote station.

G170 and G190 Applications
The G170 and G190 are multi-purpose marine displays designed to be used with a wide range of marine electronic systems and devices. Use the G170 or the G190 for:

- On board PCs with RayTechRNS software.
- On board CCTV camera monitoring (i.e. CAM100/CAM50).
- Entertainment devices (Satellite TV, DVD and game consoles).
- Other on board PC applications.
- Any navigation device or system with a VGA or DVI output.



New PRODUCT

G Marine Monitors: 19" (left) 17" (opposite page). For more information, contact your local Raymarine stockist.

GOTO

Page 71 for detailed product specifications related to this product

Key Features

- Raymarine ultra bright sunlight viewable display.
- Wide viewing angle and sharp contrast.
- Low profile, thin bezel design offers maximum display size in a small footprint.
- Impact resistant glass fascia is bonded to the LCD to prevent condensation and improve visibility.
- Anti-reflective filter reduces reflections and optimizes sunlight visibility.
- 9 video inputs.
- Adjustable backlighting with night mode.
- Direct access keys to each video input source including PIP (Picture in Picture), brightness and night mode controls.
- On Screen Display (OSD) menu for more advanced management.
- Picture In Picture with the ability to resize and reposition the second window anywhere on the display.
- Programmable video input names.

The G Marine Monitors are available in 2 sizes – 17" (G170) and 19" (G190) and have a low profile, thin bezel design for maximum display size in a small footprint.

SeaTalk² Navigation Keyboard

Raymarine's SeaTalk² Navigation Keyboard takes advantage of the powerful E Series interface through dedicated navigation buttons and intuitive softkeys. A built in cursor and rotary knob are standard, along with a convenient alphanumeric keypad. Designed to be both "built-in" and handheld, the SeaTalk² Navigation Keyboard's mounting cradle mounts flush in the dash and allows the keyboard to be removed for convenient hand held operation.

Waterproof housing.

Intuitive softkeys mirror those found on E80 and E120 network displays.

Alphanumeric keypad for fast and easy editing of navigation information.

Range, trackpad, OK, cancel and twist 'n' click controls mirror those found on E Series network displays.

Page 72 for product specifications

TYPICAL SEATALK² NAVIGATION KEYBOARD SYSTEM INTEGRATION

RayTech V6 Navigation Software | Radome Radar Antenna | Raystar125 SDGPS Antenna | G Marine Monitor | SeaTalk² Navigation Keyboard | E Series Network Display | SeaTalk Switch | DSM300 Digital Sounder Module | Transducer

CAM100 Day & Night Vision Marine Video Camera

The CAM100 is a day and night camera that instantly transforms Raymarine E Series into a powerful onboard video observation system. Improve docking safety by monitoring blind spots or keep track of the engine room and crew from the helm. From the flybridge to saloon, monitor any activity, or use multiple cameras for a total view of your vessels surroundings. The camera uses a highly sensitive IR sensor to switch from true colour to black and white night vision mode.

CAM 100 Features:

- Plug and play with Raymarine E Series.
- Automatic switching between true colour (day) and black and white (night) use.
- Automatic IR LED on/off with photo sensor.
- Excellent colour reproduction.
- Up to 15m (49') total darkness visibility in night mode (black and white).
- Clear-focus at night with anti distortion technology.

CAM100

CAM50 Colour Camera

The ideal camera for interior installations. Unobtrusive dome design is ideal for mounting in the saloon, wheel house or engine room.

CAM50 Features:

- Plug and play with Raymarine E Series.
- Ceiling or wall mount.
- Adjustable field of view.
- High quality imager.
- Excellent colour reproduction.

Reverse Image Cameras
Choose the CAM50 or CAM100 with Reverse Image for aft deck or engine room applications.

CAM50

GOTO
Page 73 for product specifications

DayNight with infrared night vision
DayNight video camera with infrared night vision

New PRODUCT

CAM100 is supplied with a clip-on metal hood.

Typical daytime image captured by the CAM100.

Typical night vision image – up to 15m (45') visibility in total darkness.

C SERIES Multifunction Displays

Chartplotter, Fishfinder, Radar or all three… they're whatever you want them to be

The C Series multifunction display gives you radar, chartplotting and fishfinder power in a single brilliant sunlight viewable display. Completely customisable, the C Series can be a powerful single function display or a complete navigation system on a single screen: easy-to-see and easy-to-use.

Features

- Navtex weather data input support.
- AIS data input support.
- Engine monitoring support for NMEA2000 and J1939 compatible engines.
- Customisable instrument and data screens, including Compass Rose and sea temperature graph.
- Plan your journey at home with RayTech software (see page 26) and then transfer your plan to C Series using a Compact Flash memory card.

Chartplotter Enhancements

- Easily visualise tide and current activity with dynamic tide and current overlay and animation.
- View the intuitive compass bar display across the top of your screen.
- Display range rings on your chart to see easily how far objects are from your vessel.
- Full support for Navionics Silver, Gold and Gold Plus cartography on Compact Flash.
- Distances less than 1/4 of a nautical mile will be displayed in metres or feet, depending on unit selection.
- Additional system integration when used with a Raymarine autopilot... engage pilot directly from your C Series display.

NMEA 2000 Data Support Enhancements:

- View graphical trim tab data.
- View graphical engine tilt data.
- View generator data.
- View trip average fuel rate.

Note: all above enhancements require connection to NMEA2000-compatible components.

Chartplotter, Fishfinder, Radar… or all three

"Raymarine's chart plotters were a vital part of the record-breaking equipment: easy to see and interpret, even at speeds of over 50 knots."

Neil McGrigor
Bradstone Challenger, Round Britain Record Holders.

"In 17 years of cruising, we've seen a lot of developments in the marine industry, but the Raymarine C80 has revolutionised our experience at sea – adding greatly to our sense of safety and pleasure. Don't leave port without one!"

Paul and Sheryl Shard
Marine authors and filmmakers, www.distantshores.ca

TECHTIP

RayTech Planner.
A 'light' version of RayTechRNS 6.0 software for planning and transferring waypoints and routes, between your PC and Raymarine chartplotters and multifunction displays is available as a **FREE** download on our website **www.raymarine.com.**

Latest Software Upgrades
The latest software for Raymarine multifunction displays is always available for download on **www.raymarine.com**

Sunlight Viewable Colour Display

NAVIONICS Gold

Complete Navigation and Control

Intuitive
- The intuitive interface puts you in command. Simply 'page' through your choice of displays.
- Create custom windows of any combination of chartplotter, radar or sonar.
- Twist 'n' Click rotary control provides easy alphanumeric waypoint storage.
- Zoom x2, x3 or x4 and user-programmable zoom scales.

Multifunction
- Configure any C Series display as a single function standalone chartplotter, digital fishfinder or radar.
- Create a combination chartplotter, radar or fishfinder.
- Build a powerful all-in-one chartplotter/radar/fishfinder system.
- AIS and Navtex data input support.

Advanced Display Technology
- Direct sunlight viewable 256 colour displays.
- Excellent contrast and a wide viewing angle.
- Prismatic light enhancing screens with integrated anti-glare filters.

TECH**TIP**

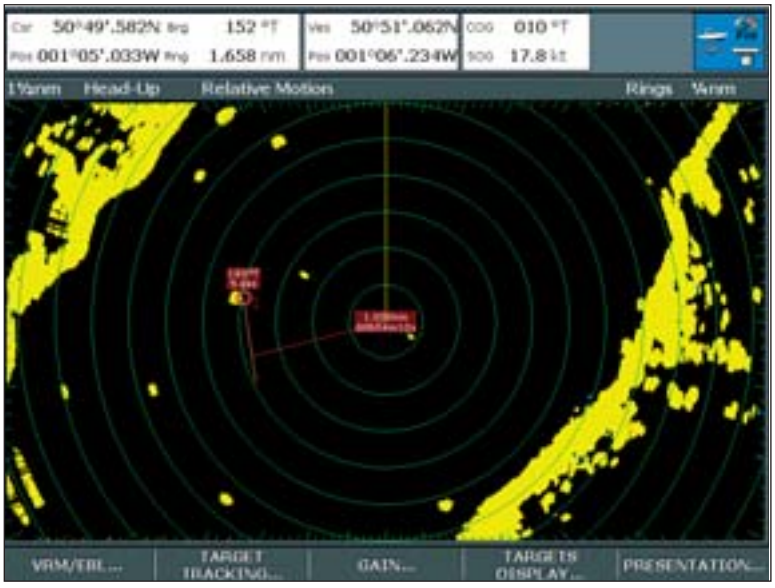
Easy C & E Series PC Waypoint Transfer Utility
Transfer waypoint data between a Microsoft Excel file and Raymarine C Series multifunction displays. **Requirements:** Raymarine C70, C80, C120, E80 or E120 display, a Windows PC with a Compact Flash reader/writer, a Compact Flash card (to ensure the integrity of your map data, Raymarine does not recommend using the Navionics® Gold card for this procedure), Microsoft Excel. GOTO **www.raymarine.com** for file download.

C Series Radar
Add an optional radome or open array scanner to create a powerful radar system.
- Radar/chart overlay.
- MARPA (Mini-Automatic-Radar-Plotting-Aid) target tracking (requires smart heading sensor).
- Waypoint navigation and multiple waypoint overlay.
- Low receiver noise figure (< 5dB).
- Auto GST™ fully automatic gain, sea clutter and tune control for real 'hands off' operation.
- Advanced microprocessor controlled transmitter-receiver features 8 pulse width/PRF settings, providing enhanced target returns through every range scale.

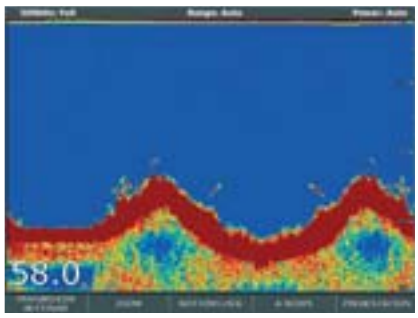
Twist 'n' Click
Quick and easy alphanumeric waypoint naming and storage using the Twist 'n' Click rotary control.

Optional Alpha Numeric Keypad
For easy waypoint, route and text editing. SeaTalk compatible. Designed for low-profile flush-mounting.

Smart Heading Sensor
For the best radar overlay and MARPA performance, choose the gyro enhanced Smart Heading Sensor or connect to a 'G' version SmartPilot autopilot system.



Typical C Series full screen radar display.

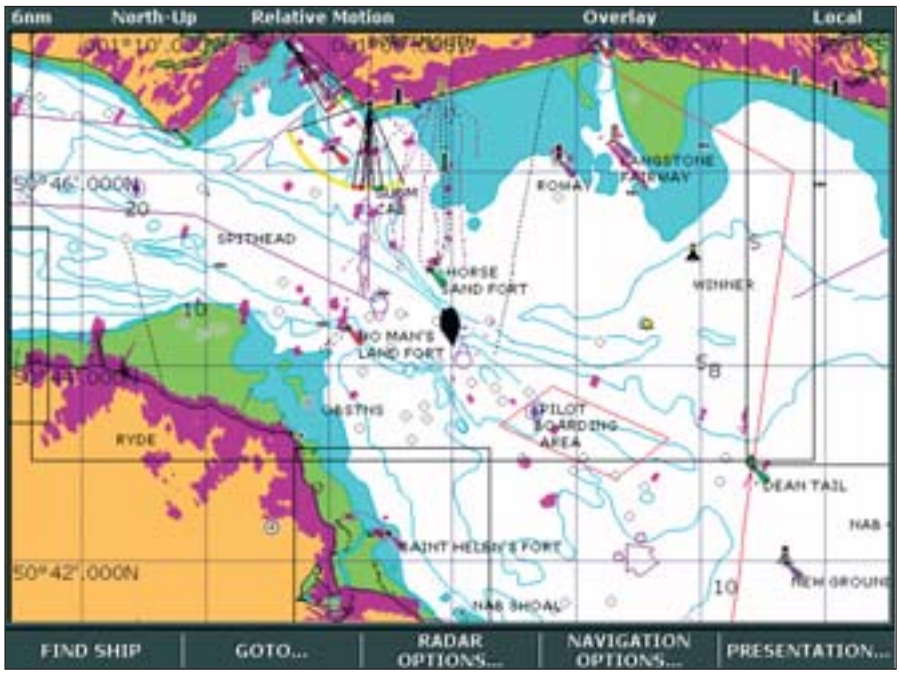


C Series HD Digital Fishfinder

Transform a C Series display into the ultimate fishfinder with HD Digital technology using an optional Raymarine digital sounder module.

- Digital Raymarine HD Digital echo sounder technology.
- Fully adaptive transmitter receiver adjusts up to 220 sonar parameters per second.
- Enhanced high-resolution 256 colour discrimination.
- 600W or 1000W transmit power.
- Fishing Waypoints: Pause the screen and save a waypoint at an exact location on the bottom graph.
- x2, x3 or x4 and user-programmable zoom scales.

Radar/Chart Overlay
Compare and reconcile radar targets with chart objects for true radar/chart integration.



Chartplotting

Connect an optional Raystar125 SDGPS (EGNOS/WAAS) Sensor and add Navionics Gold charts to transform any C Series display into an accurate and detailed GPS charting system.

- Support for professional quality Navionics Gold vector charts on compact flash cards.
- 256 colour high-resolution display and Navionics Gold provides 'paper chart' like clarity.
- True motion and relative motion modes.
- Auto range mode intelligently maintains your vessel and your waypoint on the best chart scale while underway.
- Quick and easy alphanumeric waypoint storage using the Twist 'n' Click rotary control.
- On-screen VHF DSC position reports (with compatible DSC VHF via NMEA).
- Unlimited waypoint, route and track storage using compact flash cards.

NAVIONICS Gold
THE LEADER IN ELECTRONIC CHARTS

About Navionics Gold charts

- Familiar 'paper chart' appearance.
- Clear uncluttered chart display on every range scale.
- Real-world shapes and colours of buoys and navaids.
- Shaded depth contours.
- Spot soundings.
- Tides and currents.
- Port plans and port service guides.

Multiple charts

Multiple chart scales in different windows are great for route planning.

Page 74 for product specifications

C70 6.5" (164mm) Multifunction Display

C80 8.4" (212mm) Multifunction Display

C120 12.1" (306mm) Multifunction Display

Plan waypoints and routes and transfer them between your PC and Raymarine chartplotters and multifunction displays.

RayTech V6 Navigation Software

Make the most of your time on the water. Do your plotting at home

Raymarine's RayTech V6 is a powerful and flexible software package that can be used for route planning, performance analysis, fishing charters, weather forecasting, tactics... a multitude of uses.
A 'light' version of RayTech V6 is available **FREE** as a download from **www.raymarine.com** Quick to do, easy to use, you will be able to plan your routes, add in waypoints on your PC at home and then transfer the data to your on-board Raymarine displays. Once you get to like it, give yourself an unfair advantage and go for the full version of RayTech V6.

- Plot waypoints and routes on your laptop PC, then transfer them onto your on-board Raymarine displays.
- Comes with a built-in database of worldwide tides and currents.
- Supports Navionics Gold and Platinum charts.
- Lets you record and play back displays from the HD Digital fishfinder.
- Customisable user interface lets you organise your navigation data the way you want it.
- Links straight into SeaTalk^{hs} networks, enabling you access and share radar, digital fishfinder, charts and navigation data between your PC and a Raymarine E Series system.

Give yourself an unfair advantage

You can use your RayTech V6 system to collect and analyse data, helping you get the best performance out of your boat, whether for racing or pleasure.

- Download animated weather forecasts from **www.raymarine.com.**
- Use the navigation and tactical tools to monitor wind, laylines, other boats and weather.
- Compare instrument and vessel performance with the Data-Trak time-based graphs.
- Work out your best speed and heading for the conditions, using polar data and information about ocean current, wind speed and direction.

Recommended Options

- Optional 17" and 19" G marine monitors.
- USB CompactFlash chart reader. Specifically engineered to read Navionics Gold and Platinum charts on CompactFlash cards. Also enables waypoint and route transfer between RayTech and Raymarine chartplotter products using blank CompactFlash cards.

Recommended System Requirements

- Pentium IV processor or faster (or equivalent).
- 512 MB RAM or higher.
- NVIDIA GeForce 4 graphics processor.
- Windows XP.
- Monitor – capable of displaying 1024 x 768 resolution, 16 bit colour.
- CD-ROM drive.
- Compatible USB CompactFlash Reader (dedicated card reader required for Navionics charts on CompactFlash).
- Serial port (SeaTalk/NMEA).
- Ethernet port (for SeaTalk^{hs} Networking).
- PCMCIA port (hsb^2 integration) or USB2.

Compatible Charts

- Navionics Gold, Platinum and Hot Maps on CompactFlash.
- C-MAP NT+ C-Cards (optional USB C-Card reader required).
- C-MAP NT+ PC Charts.
- MapTech Raster Charts.
- Softchart Raster Charts.
- NDI Canadian Charts.

MARINE MONITORS

Optional G 17" and 19" marine monitors available. For more information on these monitors , go to page 18 or visit our website **www.raymarine.com**

GOTO

NMEA AWARDS 2006 BEST OF SHOW RAYTECH 6.0

Page 75 for product specifications

NAVIONICS Gold THE LEADER IN ELECTRONIC CHARTS

NAVIONICS Platinum

Designed for C-MAP NT

45STV/60STV Satellite TV Antennas

Raymarine's satellite TV antennas bring the same combination of performance and ease-of-use to your onboard entertainment that you expect from our instruments.

Housed in a stylish, compact dome, our antenna systems automatically track and receive satellite TV signals in almost any conditions – giving you clear, reliable access to hundreds of digital channels.

They're easy to fit and operate too with simple cabling, an intuitive control unit and the reassurance of Raymarine's worldwide service and support network.

Better technology - better reception

Unique Wide Range Search (WRS) technology means Raymarine's antennas can identify and acquire satellite signals as quickly as possible. When you've got a fix on the satellite signal you want, our tracking algorithms will help to ensure you keep it.

They're built to cope with tough conditions, too. Dynamic Beam Tilting (DBT) continuously measures, and compensates for the vessel's heading, pitch and roll – keeping your antenna locked on a satellite and ensuring a clear picture, whatever the weather or waves are doing.

45STV

- Proprietary Wide Range Search (WRS) technology, for fastest identification and acquisition of satellites.
- Dynamic tracking: automatically compensates for extreme weather and sea conditions.
- Simplified cabling, for easy connection.
- Quieter, smoother operation: unique rotating sub-reflector minimises the need for constant dish movement.
- Supports a wide range of DVB compatible satellite TV service providers.
- FCC, IC and CE approved for the marine market.
- RoHS compliant (EU models).
- Backed by Raymarine's worldwide service and support.

60STV – New for 2007

The 60STV satellite antenna system is designed for larger vessels (50' and over). Available in Standard and Premium models, it offers all the advantages of the 45STV, plus a few more:

- Enhanced reception – industry-leading performance, even in weaker signal areas and poor weather conditions.
- GPS position interface: to acquire satellite signals even faster.
- Automated Skew Control (Premium models only): ensures maximum signal strength while under way by optimising the LNB skew position.
- Low Noise Block converter (LNB): allows support of multiple satellite receivers (quad LNB for European and Middle Eastern versions; dual LNB for China / Australia / New Zealand).

Antenna Control Unit

The system comes with a remotely-mounted control unit, which powers the antenna and features a LCD display and keypad, allowing you to select satellites manually and monitor signal strength.

Antenna Control Unit
Displays antenna status and provides power to the antenna.

System Configuration

Antenna Control Unit

- Provides power to 45/60STV antenna.
- Displays antenna status.
- Contains diagnostic indicators.
- Enables manual satellite selection.
- Connects to PCs for easy upgrades.

45/60STV Antenna

- Rugged, stabilized antenna with dual LNB or Quad LNB.
- Stylish and compact dome engineered for the harshest marine environments.
- Simplified cabling for easy installation.

45STV / 60STV Antenna → Antenna Control Unit → Satellite Receiver (not supplied) → E Series (not supplied) → G Marine Monitor (not supplied)

Page 76 for product specifications

LifeTag Wireless Man Overboard System

LifeTag is a personal man overboard (MOB) system. If a crew member falls overboard, or strays outside of range (typically 30'), contact with the base-station is broken and an alarm will sound.

LifeTag is also SeaTalk compatible allowing MOB mode to be activated on Raymarine C and E Series displays, ST60+ and ST290 instrument systems. When MOB mode is activated, an emergency waypoint (999) is created together with a bearing to that waypoint.

- Automatic wireless Man overboard (MOB) detection system.
- Simple to use.
- Standalone or integrated SeaTalk system operation.
- Quick setup.
- For skippers, crew, family and pets.
- System monitors up to 16 tags.
- Larger boats may be covered by additional base stations.

LifeTag Base Station
- Handles communication with each LifeTag.
- Outputs for external alarm siren.
- Secondary output for activating other systems.
- 12V DC power or can be powered by the SeaTalk network.

LifeTag
- Two LifeTags supplied as standard.
- Supplied strap enables LifeTag to be fitted around the wrist of an adult or child, to an article of clothing, belt loop or a pet's collar.
- LED for status feedback.
- Replaceable CR2 Lithium batteries (supplied).
- Expected battery life is one year (with over 200 operational hours).
- Tags will power off automatically.

LifeTag Alarm
- Extra loud alarm sound.
- Simple 2 wire connection to base station.

Additional information
- Extra LifeTags sold separately.
- Up to 16 crew members can be protected per LifeTag system.
- System is extendable for larger vessels.

THE BASIC SYSTEM

The basic LifeTag system consists of 2 LifeTags with straps, base station and a LifeTag alarm.

HOW LIFETAG WORKS

Signal lost from any tag

SEATALK INTEGRATION

In the event of a man overboard situation, C Series and E Series multifunction displays connected to a LifeTag system will display the position at which the signal was lost and the alarm raised. The display will also show the bearing from the vessel's current position back to the position at which the signal was lost, thereby increasing the chances of a successful recovery.

LifeTag System Warning:
The Raymarine LifeTag system is only an aid to crew safety, and must not be relied upon as the vessel's main crew safety system. It is the responsibility of the captain and all crew members to ensure that all safety instructions and procedures are in place and obeyed with local requirements. Failure to operate this system in accordance with the operating instructions may result in unreliable or reduced system performance.

GOTO Page 79 for detailed product specifications related to this product

Radar Scanners

Raymarine scanners deliver unparalled performance

Raymarine's scanners deliver unparalleled performance. The compact 2kW and 4kW radomes provide range scales of 24nm and 48nm while the high performance open arrays offer 72nm maximum range and improved target resolution*.

Open array or radome?

Choose a **radome** scanner when mounting space is limited or restricted by rigging.

Lightweight and rugged, radomes are ideal for sailboats and powerboats and provide exceptional performance even in the most challenging conditions.

Choose an **open array** scanner for enhanced performance and range. These larger scanners are equipped with a more efficient antenna (increased gain) and narrow beam widths for improved performance and target separation. Open array scanners are ideal for powerboats, commercial vessels and larger sailing vessels that demand maximum performance.

Radomes

- Choice of 2kW (18") or 4kW (24") models.
- Plug and play compatibility with any C and E series display.
- Improved radiation pattern and bearing resolution using Propagation Enhancing Geometry.
- Improved sensitivity, signal to noise ratio and lower overall receive noise.
- Greatly reduced sea clutter.
- Improved target separation and clarity at short ranges.
- Increased target visibility at long ranges.
- Lightweight and compact.
- Ideal when space is at a premium.
- Minimal power consumption.

Open Array

- Choice of 4kW and 10kW, 4' or 6' models.
- Compatible with any C and E series display.
- Narrow horizontal beam widths for enhanced target separation and better detection of small targets.
- Longer range scales.
- Increased power output for improved long range performance.
- Quiet operation.

* Actual maximum radar range will vary depending on scanner and target height. Visit **www.raymarine.com** to learn more about maximum radar ranges.

GOTO Pages 77 – 79 for product specifications

Selection Chart

Radomes and Open Arrays

RADOMES 18" (2kW) & 24" (4kW)

RADOME PRODUCT FEATURES	18"	24"
Power – kW (kilowatts)	2	4
Maximum range scale – nautical miles (nm)	24	48
Weight – lb (kg)	19.9 (9)	22.1 (10)

OPEN ARRAY 48" & 72" (4kW)

4 kW OPEN ARRAY PRODUCT FEATURES	48"	72"
Power – kW (kilowatts)	4	4
Maximum range scale – nautical miles (nm)	72	72
Weight – lb (kg)	66 (30)	73.5 (33.4)

OPEN ARRAY 48" & 72" (10kW)

10 kW OPEN ARRAY PRODUCT FEATURES	48"	72"
Power – kW (kilowatts)	10	10
Maximum range scale – nautical miles (nm)	72	72
Weight – lb (kg)	66 (30)	73.5 (33.4)

Raystar125 SDGPS Antenna

Compact satellite differential GPS receiver

Compact and accurate the Raystar125 Satellite Differential GPS receiver provides pinpoint accuracy to Raymarine's C Series and E Series Multifunction displays. The Raystar125 outputs either SeaTalk or NMEA 0183, and is fully compatible with Raymarine SeaTalk instruments and autopilots.

A self contained waterproof GPS receiver and antenna combined, the Raystar125 delivers accuracy to less than 3 metres by decoding GPS correction signals.

HD Digital Fish Imaging

It will change the way you fish forever

Conventional versus Digital

The images (right) show the wreck of a World War II Destroyer.

The image (top right) shows the wreck as seen by a conventional analogue fishfinder.

The image (below right) is the echo from a Raymarine HD Digital digital fishfinder.

The HD Digital image is much sharper and the ship's guns, masts and superstructure are clearly visible.

The HD Digital advantage

- All Raymarine fishfinders feature our HD Digital Sonar Technology.
- Digital 'adaptive' fishfinding automatically adjusts to changing water and seabed conditions.
- Pictures are dramatically clearer.

See clearly

- Conventional fishfinders produce less well defined echoes.
- HD Digital produces precise target echoes revealing more fish targets.
- Auto Adaptive transmitter receiver.
- Infinite number of receiver bandwidths.
- Accurately distinguish bait fish from larger species.
- Precisely target fish and see individual fish that ordinary fishfinders cannot.

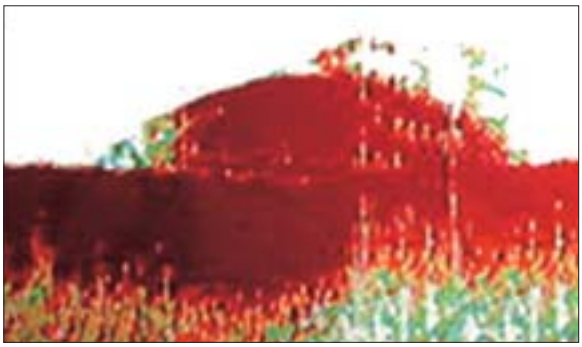
No clutter

- HD Digital eliminates surface clutter. Fixed bandwidth fishfinders exhibit surface clutter from turbulence and their own transmit signal.
- Shallow water or offshore, HD Digital targets fish accurately at all depths.

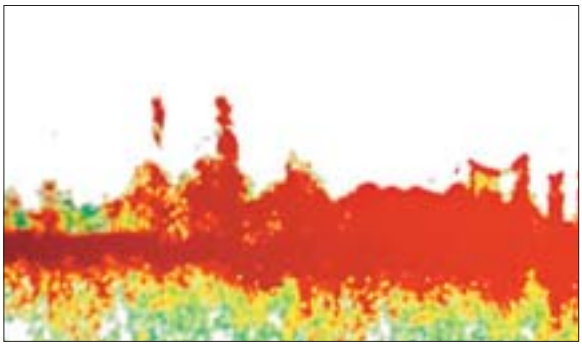
No hassle

- Maximum fish echoes and bottom discrimination in all conditions.
- HD Digital receiver out-performs ordinary fishfinders in the following conditions:
  - Shallow and deep water
  - At high speeds
  - Choppy seas
- Auto Adaptive control of:
  - Sensitivity
  - Ping rate
  - Transmit power
- Fully automatic 'hands off' operation.

CONVENTIONAL VERSUS DIGITAL

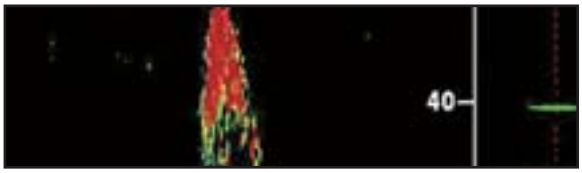


Before: conventional technology



After: HD Digital technology

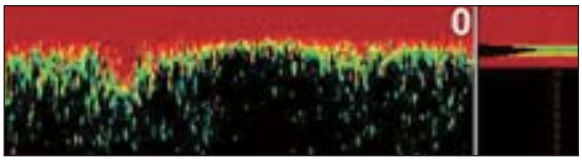
SEE CLEARLY



Before: conventional technology

After: HD Digital technology

NO CLUTTER



Before: surface clutter – conventional technology

After: surface clutter – HD Digital technology

Dual frequency (200kHz & 50kHz)

For top performance in both shallow and deep water, powerful dual frequency gives you a choice of auto frequency function or manual selection of 200kHz or 50kHz. You can choose to display either frequency in easy-to-read full screen mode or view both frequencies simultaneously in split screen mode.

A-scope and bottom coverage

See fish echoes and bottom returns in real time – A-scope technology instantaneously displays the echoes found in the transducer's acoustic beam. Using the patented bottom coverage feature, you can easily see the size of the area of seabed being covered by the transducer cone.

Bottom lock

Bottom lock has the unique ability to smooth out the seabed presentation and is extremely useful if you are looking for fish that live close to the seabed. It gives greater magnification of fish echo returns directly above the seabed, helping you differentiate structure from fish.

Zoom

Use the auto zoom to help you find fish and their habitat close to the bottom, or select manual zoom for a detailed view of fish closer to the surface. Pinpoint fish echoes with x2, x4, x6 zoom magnification.

NETWORKED SYSTEM

NETWORKED

The DSM300 adds HD Digital echo sounder technology to every display in the navigation network.

RayTech V6 Navigation Software | Radome Radar Antenna | Raystar125 SDGPS Antenna | G Marine Monitor | SeaTalk² Navigation Keyboard | E Series Network Display | SeaTalk Switch | DSM300 Digital Sounder Module | Transducer

SINGLE STATION

SINGLE STATION

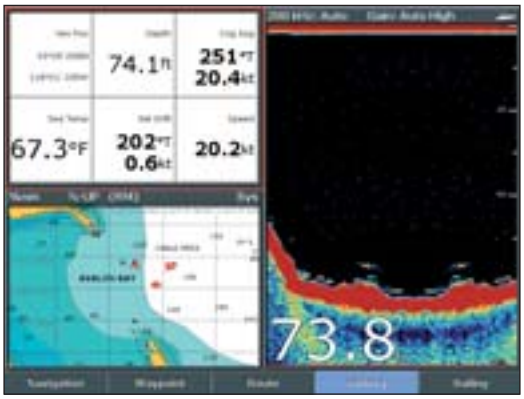
Combine the DSM300 with a radar/chartplotter display to create an 'all-in-one' integrated fishfinder/radar/chartplotter display.

Transducer | DSM300 Digital Sounder Module | Cross Over Switch | E Series Network Display | Raystar125 SDGPS Antenna | Radome Radar Antenna

Sunlight Viewable Colour Display

Sunlight viewable displays

You won't miss a thing, even if the sun is shining directly on the screen. Using Raymarine high-bright screen technology, the bright crisp screens show detailed echo returns in all lighting conditions. Each colour screen is full VGA (high resolution) for maximum detail and echo target discrimination. Each display is equipped with cold cathode fluorescent backlighting for excellent night time viewing.



DSM300 HD Digital Fishfinder Module

Whether you are a commercial fisherman, running a sport-fishing venture, diving school or involved in survey work, (or just love fishing), the latest technical developments from Raymarine will help you.

The DSM300 is a Digital Sounder Module with HD Digital technology. This 'black box' digital fishfinder provides full function fishfinder capabilities to Raymarine C Series and E Series displays.

Features

- Dual frequency operation (200/50 kHz).
- 1000 or 600 watt available output (power depending on choice of transducer).
- HD Digital Auto Adaptive Gain control (no adjustment required).
- Digitally Adaptive Transmitter Receiver with infinite receiver bandwidth settings and digital filter.
- Compatible with E Series High Speed SeaTalk^{hs} network.
- Compatible with C Series displays.

Apelco® Transducers and accessories

For more information, detailed specifications and installation instructions for the entire range of Raymarine fishfinder transducers, visit **www.raymarine.com**

High-speed transom mount (600 watts) for depth, speed and temperature.

Compact high performance 1kW rated through-hull.

Long stem, stainless steel and plastic transducers are also available.

For optimal through-hull performance choose a high speed fairing block.

Commercial grade high performance 1kW rated through-hull.

HD DIGITAL

GOTO
Page 80 for product specifications

A65 Dualfunction Fishfinder Chartplotter Display

A compact, yet powerful navigation system, the A65 Dualfunction display combines simplicity with advanced chartplotting and HD Digital™ fishfinder technology. The A65's direct sunlight viewable display and rugged construction make the A65 the perfect choice for centre consoles and open cockpits. Both bracket and console mounting hardware (Standard trunnion mounting bracket supplied – console mount optional). are available for easy installation of A65 on the helm, in the dash, or in the overhead console.

Display Features

- 6.5" sunlight viewable colour display.
- High resolution 640 x 480 pixels (VGA).
- Prismatic light enhancing display with a wide viewing angle.
- Rugged submersible construction (IPX7 standard).
- Standard trunnion mounting bracket (optional console (flush) mount).
- RS12 channel satellite differential GPS receiver (WAAS/EGNOS).
- NMEA 0183 Input and Output.
- Plug and Play DSM25 HD Digital sounder module option.

Chart Features

- Navionics XL3 Gold charts.
- High speed chart redraw.
- 1000 waypoints and 50 routes with unlimited waypoint and route storage using optional CompactFlash memory card.
- Chart rotation modes (Head Up, Course Up and North Up).
- Chart screen offset for a maximum 'look ahead' chart display.

Page 82 for product specifications

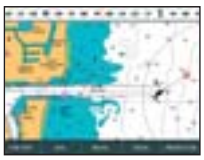
Sunlight Viewable Colour Display

HD DIGITAL

NAVIONICS Gold THE LEADER IN ELECTRONIC CHARTS

CARTOGRAPHY

The A65 uses Navionics Gold cartography for stunning clarity and unrivalled chart information. (These 'paper like' electronic charts are available on compact flash memory cards).



FLUSH MOUNT OPTION

Optional console (flush) mount available.

DSM25 Digital Echo Sounder Module

DSM25 HD Digital Sounder Module and transom mount transducer.

Designed for exclusive use with the A65 GPS Chartplotter, the 500 Watt digital sounder module features the same award winning digital technology used on the top of the range Raymarine DSM300.

DSM25 Features:

- Transforms A65 GPS Chartplotter into a full function combination chartplotter/ digital fishfinder.
- Rugged submersible construction (IPX7 standard).
- Plug and Play.
- 500 Watts RMS output power.
- Raymarine's patented HD Digital fishfinder technology.
- Dual frequency (50/200 kHz) for excellent inshore and offshore performance.
- HD Digital technology automatically adjusts more than 220 sonar parameters per second and virtually eliminates clutter.
- HD Digital adaptive receiver technology precisely targets fish and bottom structure with amazing clarity.
- Transom mount transducer as standard, In-Hull, Trolling motor and Thru-Hull transducer options.

A65
Relative Motion
North-Up
ENTER
CANCEL
RANGE
PAGE
ACTIVE
WPTS
MOB
DATA
MENU
ROUTES
TRACKS
PRESENTATION

The product image (left) shows the RC435. The RC435i is physically identical to the RC435. However, it has the GPS sensor built into the case.

RC435/RC435i Chartplotters

Big on colour, big on performance

The Raychart 435 and 435i chartplotters provide crystal-clear detail using full sunlight viewable colour displays and easy-view colour charts. Complete with a 12 channel satellite differential GPS receiver (built-in on the 435i) and fast chart updates, the Raychart 435 and 435i deliver the accuracy you need.

Navionics® Gold chart support

See depth contours, spot soundings, and underwater structures in precise detail, or take advantage of quick access to port plans, tides and currents, and notice to mariners information using the information-rich database built in to every Gold chart.

Navigate with colour

High resolution colour display, professional quality vector cartography, and 'point and shoot' navigation makes the Raychart 435/435i the choice for affordable advanced electronic charting.

Compact flash storage

Compact Flash cards are used to access charts or store waypoints, routes and tracks. A choice of chart sizes is available with support for Navionics Gold and Gold XL (extra-large) sized charts.

RC435/RC435i Features

- Affordable colour electronic charting.
- Direct sunlight viewable display.
- Navionics Gold colour cartography.
- Store all your favourite routes and some new ones too – compact flash support for cartography and unlimited waypoint, route and track storage.
- No extra steps – SmartRoute automatically builds routes and waypoints from previous tracks.
- See exactly where you are – vessel symbol, waypoint destination and appropriate chart range are kept in clear view while underway using autozoom and screen amplifier functions.
- Comes complete with standard 12 channel satellite differential GPS receiver (built-in on RC435i) for accuracy using WAAS or EGNOS system.
- Rugged waterproof (CFR46) display and Raymarine reliability backed by a superior 2 year warranty and worldwide service and distribution network.

LCD Display viewable in bright sunlight

Page 84 for detailed product specifications related to this product

DS500X/DS600X Fishfinders

Dual frequency fishfinders with 500 Watt output

The A Series incorporates Raymarine's digital sonar technology, HD Digital. Raymarine HD Digital sets a new standard in sonar performance thanks to an adaptive digital sonar receiver that intelligently monitors the water column and brings fish and bottom structure into crystal clear focus.

DS500X Features

- DS500X: 5" 256 colour TFT display.
- Dual frequency 50/200kHz for excellent inshore and offshore performance.
- Hands free, fully automatic HD Digital technology adjusts more than 220 sonar parameters a second.
- NMEA 0183 interface displays GPS waypoint and position data.
- Submersible construction. IPX7 standard: submersible to 1 metre for at least 30 minutes.
- View real time images of fish and bottom structure beneath the transducer with three modes of A-Scope.

DS600X Features

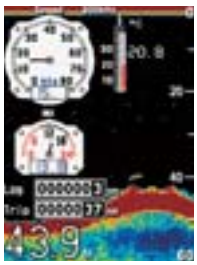
- 5.7" 256 colour TFT daylight viewable LCD display.
- HD Digital (High Definition Fish Imaging).
- Simple menu-driven operation.
- Speedometer style digital data screen overlay.
- Submersible construction. IPX7 standard: submersible to 1 metre for at least 30 minutes.
- Dual frequency 50/200kHz for excellent inshore and offshore performance.
- Hands free, fully automatic HD Digital technology adjusts more than 220 sonar parameters a second.
- NMEA 0183 interface displays GPS waypoint and position data.
- View real time images of fish and bottom structure beneath the transducer with three modes of A-Scope.

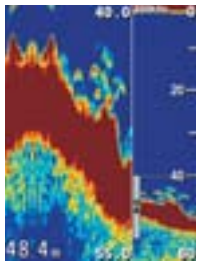
"…this innovative fishfinder technology displays 20 or more times the fish seen on a traditional unit."

Motor Boating Magazine

TYPICAL FISHFINDER DISPLAYS

Easy-to-read gauge-style displays of speed, temperature, and battery voltage.





x2, x3 and x4 zoom maximizes fish and bottom echoes. Choose full or split screen modes plus auto or manual zoom control.

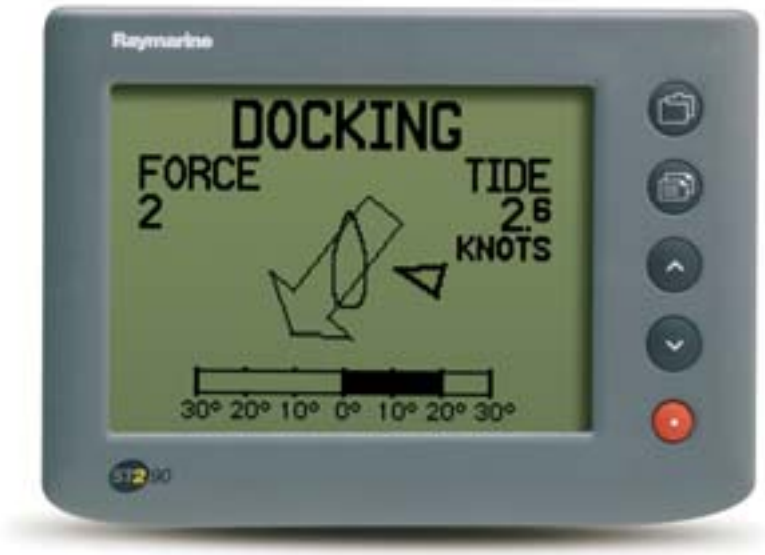
ST290 Instrumentation

ST290 Graphic display with four separate information displays open at the same time.

Smarter, larger and up to 20 times faster
Combining big, bold, user-friendly displays with intelligent transducers, ST290 uses superfast SeaTalk^2 technology to create a comprehensive information network with data rates up to 20 times faster than competitive systems.

Navigation, heading, autopilot and environmental data plus depth, speed and wind – ST290 has been engineered for simplicity and ease of use. Displays and controls can be flush-mounted into dashes or bulkheads and a surface mount option is also available. The advanced design makes calibration easy. For serious performance data and comparisons, you can integrate the system with your PC using the RayTech SailRacer software interface (excluding E Series).

Emma Richards and Mike Sanderson of Pindar Ocean Racing aboard Open 60 'Pindar Alphagraphics'. Photo: Marc Turner.



ST290 Features

- Big, clear displays.
- Comprehensive range of digital and analogue displays, plus separate keypads.
- Easy-to-install, set up and use.
- More accurate data - advanced transducers and calibration.
- CAN Bus (SeaTalk²) – faster and with more data capacity.
- NMEA 2000 compliant.
- System flexibility - small or large systems.
- 2-way PC communication via RayTech PC software.
- Clean styling with low profile, flush-mount displays.

ST290 Graphic

Use the ST290 Graphic to control and display every available information source. For maximum visibility, the large dot-matrix LCD has easy-to-read graphics in giant or multi-line formats. Intuitive menus and simple 'Chapter and Page' control keys give quick and easy access to graphs, diagrams or numeric displays. The convenient 'Favourites' chapter makes it easy to set the information in the order you want to see it.

ST290 Data

The ideal repeater solution, the ST290 Data is one of the largest dual line displays available and features an intelligent scrolling 'Favourites' chapter for vital information. 'Chapter and Page' keys provide access to all information across the ST290 network.

Data Processing Unit (DPU)

Delivering advanced rapid data calculations, the intelligent and powerful DPU is the easy connection point and can be used for other equipment as well as PC connectivity.

ST290 Analogue Compass

Displays heading and course over ground (GPS input required) and average heading data.

ST290 Analogue Wind & Close Hauled Wind

Displays precise analogue wind direction with a digital readout of wind speed or VMG. The close hauled wind display magnifies wind direction between 20° and 60°.

TECHTIP

SmartController

Take full, on-board control of your Raymarine SeaTalk instruments with the wireless SmartController. Wireless operation means freedon to monitor vital information when on deck or out of sight of your instruments.

ST290 Rudder Angle Display
Shows the position of the rudder and complements ST290 systems with integrated autopilots.

ST290 Pilot Keypad
The easy-to-use, push-button ST290 Pilot Keypad with 1° and 10° degree course change buttons gives complete autopilot control.

MOB (Man Over Board) Keypad
Activates Man Over Board function on Raymarine navigation aids.

ST290 Remote Keypad
Gives complete remote control of ST290 Graphic and Data displays.

TECH**TIP**

ST290. RayTech software users can further customise their ST290 system with advanced RayTech tactical data using ST290's custom data channels.

A complete ST290 Autopilot system needs an ST290 DPU, a Graphic display and a Smartpilot Series core pack and drive unit. See pages 58 & 59 for more autopilot details.

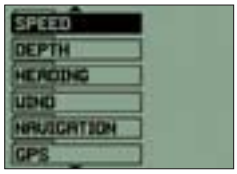
Integrated autopilot display & control
Use the dedicated pilot chapters on both the ST290 graphic and data displays and combine with an ST290 pilot keypad for full autopilot control.

Transducers
Transducers deliver optimum performance thanks to advanced calibration and super-fast data communication.

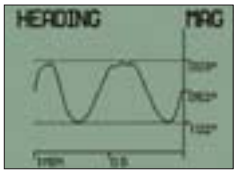
Pages 85 – 87 for product specifications

SAMPLE ST290 SCREENS

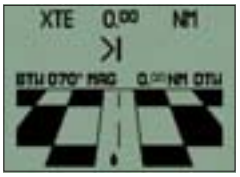
Autopilot status.



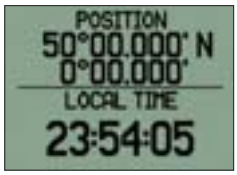
Chapter selection.



Heading histogram.



Cross Track Error (XTE).



Position and time.

Engine log.

Split screen option.

Speed and depth.

Quad screen option.

Sample graphic display pages
ST290 allows for complete system customisation. Activate every chapter and page or configure a display to perform one dedicated function, the choice is yours.

The 'Favourites' chapter can also be configured to intelligently scroll through custom pages of information at user-defined intervals.

Available ST290 data chapters
Favourites/Depth/Heading/Speed/Vessel/GPS/Wind/Navigation/Pilot/Timers/Alarms/Environment/Engine.

ST60+ Instruments

Instruments of choice – worldwide
ST60+ offers everything from stand-alone display units to sophisticated, fully-integrated systems. Significantly enhanced displays ensure superior viewing angles for both day and night conditions. Simple, push-button controls make ST60+ instruments extremely easy to use.

Features
- Bezels to match C and E Series multi-function displays.
- Speed over ground (SOG) now available on Speed and Tridata.
- Automatic switching of depth sensors when used with depth sounder modules to eliminate interference.
- 'Soft' power down.

"We selected Raymarine equipment because it is very user-friendly. This is one of Raymarine's greatest strengths. A journey of this scale in a boat this old is a huge challenge, but Raymarine's equipment will provide the modern approach to safety and navigation that will be so important."

Alan Priddy – Lively Lady

ST60+ OPTIONS

Flush Mount
ST60+ Speed shown with the optional flush-mount bezel.

Rear panel mounting
Install instruments neatly behind a bulkhead with the rear panel mounting kit.

Dash top installation
For dash top installations, use the trunnion mounting kit.

Transducers
High-performance long and short-arm masthead wind transducers.

Transducers
Plastic self-sealing transducers supplied as standard.

Cables
SeaTalk cables are available in 1m (3') to 20m (60') lengths.

Club House Wind
"On Shore" version of the ST60 Plus wind system. Wind speed and direction displayed within an easy-to-read compass rose.

TECH**TIP**

SmartController
Take full, on-board control of your Raymarine SeaTalk instruments with the wireless SmartController. Wireless operation means freedon to monitor vital information when on deck or out of sight of your instruments.

ST60+ Depth
- Easy-view large digits plus depth trend indicator.
- Min/max depth.
- Audible shallow, anchor and deep water alarms.

ST60+ Compass
Dedicated easy-to-read analogue/digital display with patented fluxgate transducer.

ST60+ Wind
- Combines analogue and digital measurements.
- Calculates both apparent and true (relative) wind speed/direction (true wind requires SeaTalk speed through water data).

ST60+ Tridata
Combines depth and speed data in an easy-to-read 3-line display. Dedicated depth and speed displays with trip/log, sea temperature and SOG.

ST60+ Graphic

- Displays all ST60+ data on SeaTalk with easy-to-read graphics and multi-line formats.
- Up to 7 configurable 'favourites' pages with single, dual, triple or quad data formats.
- Speed, depth, wind, heading, navigate, autopilot, environment and favourite chapters.
- NMEA in and out and external alarm drive.

ST60+ Rudder
ST60+ analogue rudder display available with rudder transducer or used as a repeater for a Raymarine SeaTalk autopilot.

ST60+ Close Hauled Wind
Magnified 20° – 60° display for when a single degree can make all the difference.

ST60+ Speed
Displays speed through water, speed over ground (GPS required), sea surface temperature, trip and log data.

GOTO Pages 88 – 89 for product specifications

'Soft' Power Down
Individual heads may be turned off using the 'soft' power down key.

ST40 Instruments

Some of the best things come in small packages
Big displays for smaller powerboats, yachts and RIBs, these powerful SeaTalk instruments offer full integration with Raymarine autopilots and navigation equipment and can be surface or trunnion mounted.

Extra large (28mm max) digits and razor sharp LCDs – easy-to-use ST40 instruments have outstanding visibility in all lighting conditions.

ST40 Speed
Shows current, maximum and average boat speed, log, trip and sea temperature.

ST40 Bidata
Speed, depth, log and sea temperature. Two sets of data at once in large or small digits.

ST40 Rotavector wind transducer supplied with the wind system.

GOTO Page 90 for product specifications

ST40 Compass
Displays current compass heading plus locked heading, has 'off course' alarms and can be used as a 'Man Over Board' repeater.

ST40 Depth
Crystal clear depth readout. Shallow and deep anchor alarms and minimum depth display.

ST40 Wind
Apparent wind speed and direction and true wind speed and direction. Talks to your autopilot to steer your boat to a saved apparent wind angle.

ST290/ST60+ Wind Transducers

The new style wind transducers offer improved start-up speeds, smoother operation and greater accuracy. There are two designs to choose from: aluminium short arm or carbon fibre long arm.

Wind Transducer Features

- 1° directional accuracy.
- Low start-up speed (<1 knot).
- Positive locking mechanism with solid pins.
- Quality low friction bearings.
- 30m or 50m cable lengths.
- Fits into existing older style block.

GOTO Page 91 for product specifications

"The autopilot system steers the boat to a course better than our best racing helm."

David Pinner
Skipper of 'Kiss' X-Yachts X35 one design

Autohelm Autopilots: The extra crew member at your command

It's a beautiful day, the sun's out and you fancy a break. Let the autopilot take the strain while you relax with a drink.

Or, if the wind whips up, just hit the button while you shorten sail or head below to check everything's secure. Even when It's blowing a gale, the waves are 30' high, and you're racing hundreds of miles from land…

"I can't say enough about the reliability and performance of my Raymarine electronics," says Brad van Liew, Class 2 Around Alone race winner and Open 50 24hr distance record holder. "Other skippers have needed to hand steer to be competitive. On board Tommy Hilfiger Freedom America, the Raymarine pilot with its superior software steered as well as any fully concentrated professional."

From a basic tiller pilot to a powerful inboard system, each Raymarine autopilot comes with a simple, intuitive keypad and clear, functional LCD display.

So what is an Autopilot?
An autopilot connects to your steering system and continually corrects your boat's heading with information supplied by the compass, wind transducers or GPS.

Autopilots are designed to maintain an accurate course in various sea conditions with minimal helm movements. They can act as a spare pair of hands or an extra crew member allowing you to trim the sails or get the fenders over the side. Because they steer so accurately, they will save fuel and get you to your destination faster, especially when connected to a chart plotter.

Autopilots consist of three main components: a heading sensor (usually a compass), a processor and drive controller (the brains), and a drive mechanism (the business end).

Autopilot Types
There are two types of autopilot, Cockpit and Inboard (also called below-decks). Cockpit pilots are simple to install and remain in the cockpit in all types of weather. Inboard autopilots are permanently mounted below decks and are more powerful, more reliable, steer your boat better and can be supplied with a range of autopilot controllers.

Raymarine autopilots work so well that it's sometimes easy to forget that they can't see – so they can't avoid obstacles or other vessels. Always keep a vigilant watch.

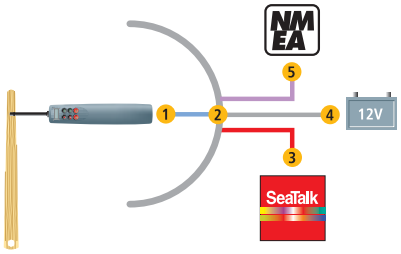
ST1000/ST2000 Tiller Pilots: Helm mounted autopilots for tiller steered yachts

ST1000/ST2000

Invented by Autohelm in 1973, tiller pilots have consistently been the world's most popular pilot ever since, setting the standard for performance, reliability and ease of use. Advanced features are standard. AutoTack lets you handle the sheets while the pilot tacks the boat, and AutoSeastate intelligently keeps the boat on course while conserving power.

Whether used as a stand-alone pilot or with a SeaTalk/NMEA GPS, the clear backlit LCD and 6-button keypad make these pilots safe and easy to use.

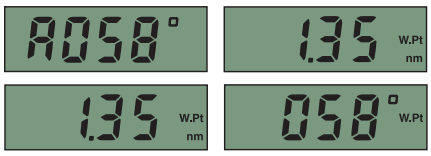
Page 97 for product specifications



1. Tiller drive **2.** Bulkhead connection
3. SeaTalk network **4.** 12v DC **5.** NMEA GPS

	Maximum Displacement*
ST1000	3,000kg (6,600lbs)
ST2000	4,500kg (10,000 lbs)

***Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.**



Typical ST1000 and ST2000 tillerpilot displays.

S1 Plus/S1GP Tiller Drive Pilots

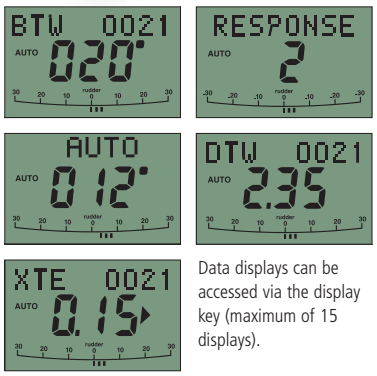
S1 Plus and S1 GP Tiller Pilots

The rugged drive units of S1 Plus and S1 GP make them the perfect pilots for larger tiller steered yachts.

You can steer straight to a waypoint, lock on to a given wind angle, or simply set and follow a course to steer by making the most of the full SeaTalk and NMEA compatibility. The fluxgate compass is separated from the drive unit for greater accuracy and you can mount the control unit wherever it will be within easy reach for you. Used by some of the world's top single-handers, Raymarine tiller pilots meet the demands of the serious sailor. The S1 Plus Tiller Pilot is suitable for most cruising and racing scenarios, however, extended cruising or challenging racing conditions may benefit from the added ruggedness of the S1 GP Tiller Pilot. Whichever you choose, the large clear display shows you up-to-the-minute information and also acts as a multifunction instrument or navaid repeater.

Features

- Unique tillerpilot system with full function ST6002 control head and remote mounted fluxgate compass.
- SeaTalk networking allows for additional ST7002/ST8002 control heads.
- Powerful tiller drive unit is compact and unobtrusive.
- Rudder reference transducer not required.



Data displays can be accessed via the display key (maximum of 15 displays).

S1 Plus and S1 GP

1. S1 Course Computer
2. 12v DC
3. NMEA GPS
4. Tiller drive
5. Control head flush-mount option
6. Optional control heads ST6002/ST7002/ST8002
7. SeaTalk network
8. Optional: fluxgate compass

Installation

We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat. An approved installation also carries our full worldwide 2 year warranty.

	Recommended Maximum Displacement*
S1 Plus Tiller Pilot	6,000kg (13,200lbs)
S1 GP Tiller Pilot	7,500kg (16,500 lbs)

***Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.**

Note: For extended cruising, we recommend the use of the more powerful S1 GP Tiller Drive.

S1 Wheel Pilot

The S1 wheel pilot is equipped with the fully enclosed MkII wheel-drive for simple installation and superb autopilot performance. Mount the separate control unit where it is easy to reach and see. The course computer and patented fluxgate compass is mounted separately for optimum performance.

The LCD shows the pilot status and repeats up to 15 pages of user-defined navigation data from any SeaTalk system.

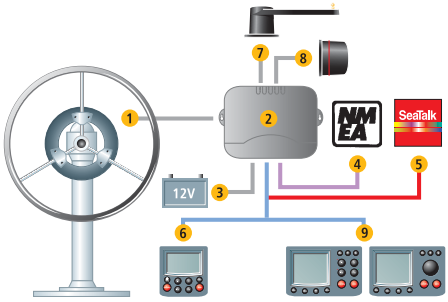
The rugged MkII wheel-drive unit is available as an upgrade for existing ST4000 systems.

Features

- Quick and easy installation.
- Fits most types of wheel.
- Independent display for 'best location'.
- Simple clutch engagement mechanism.
- Clean design.

Installation

We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat. An approved installation also carries our full worldwide 2 year warranty.



S1 Wheel Drive Pilot system.
1. Wheel drive **2.** S1 Course computer
3. 12v DC **4.** NMEA 0183
5. SeaTalk network **6.** ST6002 Control head
7. Rudder reference **8.** Fluxgate compass
9. Optional control heads ST7002/ST8002

Display Head Options

The S1 Wheel Pilot is also supplied with the ST6002 Control head. However, additional controls (ST7002 and ST8002) are available for second station installations.

	Recommended Maximum Displacement*
S1 Wheel Pilot	7,500kg (16,500 lbs)

*** Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.**

GOTO Page 96 for product specifications

Smartpilot Inboard Autopilot Systems

Next to choosing the boat itself, choosing the right autopilot can be one of the most important decision a boat owner has to make. With a vast array of autopilot models and configurations to choose from, selecting the right autopilot can seem like a daunting task. The following pages are designed to help you choose the right Raymarine SmartPilot system for your boat.

A SmartPilot system consists of three elements:

Autopilot control Head
This is the display unit you use to control your autopilot system. Raymarine offers a number of options, including multiple control heads, as well as full-function remotes and joystick controls.

Corepack
The corepack is the central intelligence hub of the autopilot system, linking your control head to the drive unit.

Drive Unit
The drive unit is the part that interfaces with your vessel's steering system to keep you on the right course. Raymarine has a broad range of drive units, to match almost any type of steering system.

Over the next few pages, we'll explain the factors to consider when choosing each of these parts of your system.

> "The autopilot steered, giving my wife two hands instead of one to control the sheets, guys and downhaul while I moved the baby stay and dip pole gybed – then, still on the foredeck, used the remote control to gybe the boat while my wife controlled the mainsheet."

COREPACK

Corepack consisting of: course computer, fluxgate compass and rudder reference transducer.

Step 1. Drive Unit Selection

Know your boat and your steering system
The first step in selecting a Raymarine autopilot from the Raymarine is to choose the proper autopilot drive unit for your vessel. Raymarine autopilot drive units are available in an array of sizes and configurations to accommodate various steering types and vessel displacements.

What type of steering system do I have?
To select an autopilot correctly, you will need to find out what type of steering system is installed on your vessel. This may involve opening a few hatches and taking a peek at the gear, or this can be a simple case of consulting your boat dealer or steering manufacturer.

Raymarine SmartPilot systems accommodate hydraulic, mechanical, and power assisted stern drive systems. If you are not sure how to determine what type of steering system is installed on your vessel, please consult an authorised Raymarine dealer. Raymarine dealers are well-skilled and have been Raymarine trained to evaluate and assist you in selecting the right autopilot for your boat.

TECH**TIP**

Installation
We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat. An approved installation also carries our full worldwide 2 year warranty.

Raymarine hydraulic pump

1.1 Hydraulic steering systems

Raymarine SmartPilots connect to hydraulic steering systems using a rugged hydraulic pump matched to the capacity of the hydraulic steering system. To match a Raymarine SmartPilot hydraulic pump to your vessel you need to know the size (in cc) of the hydraulic cylinder ram(s) that is mounted to the rudder on inboard engined boats, or mounted to the drive unit on outboard engined boats. Your steering system documentation will have this information. Alternatively, you can look on the cylinder ram itself for the brand and model number. Once you know the model number, visit our website (www.raymarine.com) and access our hydraulic cylinder ram cross-reference guide to determine which hydraulic autopilot pump is compatible with your vessel's hydraulic steering system.

Raymarine autopilot hydraulic pumps are available in several sizes to accommodate the broad range of steering cylinder capacities. The table below shows the capacity of each Raymarine hydraulic autopilot pump when used with the corresponding SmartPilot corepack.

DRIVE TYPE	**TYPE 1**	**TYPE 1**	**TYPE 2**	**TYPE 3**
Vessel displacement	Not applicable for hydraulic steering as the drive unit is matched to the ram capacity of the steering system			
Ram capacity	80–172 cc (4.9 – 10.5in^3)	80–230 cc (4.9 – 14in^3)	230–350 cc (14 – 21in^3)	350–500 cc (21 – 30.5in^3)
Maximum stall pressure at 12V	50 bar (750 psi)	50 bar (750 psi)	100 bar (1450 psi)	80 bar (1160 psi)
Peak flow rate (no load)	1000 cc/min	1000 cc/min	2000 cc/min	2900 cc/min
Corepack used	S1 or S1G	S2 or S2G	S3 or S3G	S3 or S3G

- In some systems with dual steering rams in parallel, cylinder capacity is the total of both rams, rams in series only require the one valve.
- Vessels with outboard engines require a rudder reference feedback transducer for optimum performance.
- Hydraulic steering systems with steering rams over 500cc require our larger constant running hydraulic pump used in conjunction with S3 or S3G corepacks - contact Raymarine for details.
- Vessels with 24V DC power must use the S3 or S3G core pack and 24V drive.
- An authorised Raymarine dealer is best suited to installing a hydraulic autopilot system.

1.2 Mechanical steering systems

When selecting an autopilot drive unit for a mechanical steering system, the vessel displacement is the determining factor for selecting the correct drive. **When determining your vessel displacement, always add 20% to the dry weight of your vessel to account for the added weight of fuel, gear, provisions and people.** Next, select the type of autopilot drive unit that is right for your mechanical steering system. Raymarine SmartPilot drive units for mechanical steering systems are available in linear, hydraulic linear and rotary configurations.

Mechanical linear drives

Our most commonly used drive types for sailing vessels. Raymarine mechanical linear drives provide powerful thrust, fast hard-over times and quiet operation. Mounted below decks, the linear drive moves the rudder directly by pushing the tiller arm or a rudder quadrant.

DRIVE TYPE	TYPE 1	TYPE 1	TYPE 2 SHORT	TYPE 2 LONG
Maximum boat displacement	9,000 kg (20,000 lb)	11,000 kg (24,000 lb)	15,000 kg (33,000 lb)	20,000 kg (44,000 lb)
Peak thrust	295 kg (650 lb)	295 kg (650 lb)	480 kg (1,050 lb)	480 kg (1,050 lb)
Maximum stroke	300 mm (12")	300 mm (12")	300 mm (12")	400 mm (16")
Hard over to hard over times (+/- 35°, no load)	11 seconds	11 seconds	11 seconds	14 seconds
Maximum rudder torque	735 nm (6,500 lb.in)	735 nm (6,500 lb.in)	1,190 nm (10,500 lb.in)	1,660 nm (14,700 lb.in)
Power consumption	18–36 W	18–36 W	48–72 W	48–72 W
Corepack used	**S1 or S1G**	**S2 or S2G**	**S3 or S3G**	**S3 or S3G**

Notes:
- A linear drive unit connects to the rudder stock via an independent tiller arm. Accessory fittings from your steering system manufacturer may be required.
- Vessels with 24V DC power must use S3 or S3G corepacks and a 24V drive.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Must be able to back-drive steering system from the rudder.

Hydraulic linear drives

Designed for larger mechanically steered vessels over 20,000kg, our hydraulic linear drives are self-contained hydraulic steering systems consisting of a reversing pump, reservoir and hydraulic ram.

DRIVE TYPE	T2	T3
Maximum boat displacement	22,000 kg (48,500 lb)	35,000 kg (77,000 lb)
Peak thrust	585 kg (1,290 lb)	1,200 kg (2,700 lb)
Maximum stroke	254 mm (10")	300 mm (12")
Hard over to hard over times (+/- 35°, no load)	10 seconds	12 seconds
Maximum rudder torque	1,270 nm (11,300 lb.in)	3,200 nm (28,800 lb.in)
Corepack used	**S3 or S3G**	**S3 or S3G**

Notes:
- An hydraulic linear drive unit connects to the rudder stock via an independent tiller arm. Accessory fittings from your steering system manufacturer may be required.
- Vessels with 24V DC power must use S3 or S3G corepacks and a 24V drive.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Must be able to back drive steering system for the rudder.

Mechanical rotary drives

The rotary drive is designed for power and sailboat systems that can be driven from the helm position through a chain and sprocket (e.g. cable and rod steering systems). The outstanding design of the Raymarine rotary drive unit provides smooth, powerful autopilot controlled steering with quiet operation. Use the table below to select a rotary drive suitable for your vessel displacement.

ROTARY DRIVE TYPE	TYPE 1	TYPE 1	TYPE 2
Maximum boat displacement	9,000 kg (20,000 lb)	11,000 kg (24,000 lb)	20,000 kg (44,000 lb)
Peak output torque	20 nm (180 lb.in)	20 nm (180 lb.in)	34 nm (300 lb.in)
Maximum shaft speed	33 rpm	33 rpm	33 rpm
Recommended hard-over times (no load)	10 seconds	10 seconds	10 seconds
Power consumption	24–48 W	24–48 W	60–84 W
Corepack used	**S1 or S1G**	**S2 or S2G**	**S3 or S3G**

Notes:
- Optional drive sprockets and modification to the steering chain may be required.
- Vessels with 24V DC power must use S3 or S3G corepacks and a 24V drive.
- An authorised Raymarine dealer is best suited for installing a linear drive system.

UNIVERSAL STERN DRIVE (12V)	I/O DRIVE
Maximum boat displacement	Does not apply
Drive method	Electromechanical
Maximum thrust	50 kg (110 lb)
Recommended hard over times	8.8 seconds
Maximum stroke	214 mm (8.3")
Corepack used	**S1 or S1G**

Notes:
- **Always verify compatibility before installing a drive unit by consulting an authorised Raymarine dealer or Raymarine's Customer Support team.**
- The drive is compatible with 1997 or later Mercruiser power assist inboard/outboard drives and Volvo Penta.
- Vessels with 12V systems only.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Compatible with Volvo Penta and Mercruiser I/O drive engines – see dealer for bracket options with standard I/O drive.

Step 2. Choosing Your Corepack

Once you have selected the correct drive unit, the next step is to select a SmartPilot corepack. Corepacks contain the SmartPilot course computer which are available in standard configurations or 'G' versions with built-in Rate Gyro sensors and Raymarine's advanced steering technology (AST). SmartPilot corepacks are available in three performance levels – S1, S2 and S3. Based on the type of drive unit, use the following chart to select the appropriate SmartPilot corepack.

S1 and S1G Features

- 12V 'mini' course computer designed for use with Type 1 drive units.
- 6 Amp (15 Amp peak) motor drive output.
- Recommended for mechanically steered vessels under 9,000 kg.
- Recommended for hydraulically steered vessels with cylinder rams between 80cc and 172cc.
- I/O drives.

S2 and S2G Features

- 12V course computer designed for use with Type 1 drive units.
- 15 Amp (20 Amp peak) motor drive output.
- Recommended for mechanically steered vessels under 11,000 kg.
- Recommended for hydraulically steered vessels with cylinder rams between 80cc and 230cc.

S3 and S3G Features

- 12/24V course computer designed for use with Type 1/2/3 drive units.
- 30 Amp (40 Amp peak) motor drive output.
- Recommended for mechanically steered vessels under 35,000 kg.
- Recommended for hydraulically steered vessels with cylinder rams between 230– 500cc and 1200cc with CR pump.
- Compatible with Raymarine constant running hydraulic pumps and hydraulic linear drive systems.

CORE PACKS	S1	S1G	S2	S2G	S3	S3G
Compatible drive types	Type 1	Type 1	Type 1	Type 1	Type 1/2/3	Type 1/2/3
Supply voltage – volts	12	12	12	12	12/24	12/24
Motor drive current (continuous peak) – Amps	6 (15)	6 (15)	15 (20)	15 (20)	30 (40)	30 (40)
Clutch current – Amps	2	2	4	4	4	4
Solenoid drive interface	No	No	Yes	Yes	Yes	Yes
Built-in Rate Gyro	Upgradeable	Standard	Upgradeable	Standard	Upgradeable	Standard
Advanced Steering Technology (AST) with AutoLearn	Upgradeable	Standard	Upgradeable	Standard	Upgradeable	Standard
Fast Gyro Stabilised heading output for MARPA and radar/chart overlay on raymarine radars	Upgradeable	5Hz	Upgradeable	10Hz	Upgradeable	10Hz

More powerful and rugged than ever before, SmartPilot course computers serve as the central intelligence hub of our inboard pilot systems.

With SmartPilot course computers you can:

Control the way the pilot steers your boat using sensitive response AST for the most comfortable ride or to conserve power on long sail passages.

Set your pilot up for optimum performance using the intelligent AutoLearn function with new control units, AST* and AutoLearn* software to automatically learn your boat's handling characteristics.

Stay right on course when the going gets tough using Fastrim AST to correct any changes in standing helm to keep the vessel on course (e.g. weather helm or loss of one engine).

MARPA and Radar/Chart Overlay* G-series course computers also provide accurate and stable heading data for MARPA and chart overlay functions on Raymarine's Pathfinder radars and chartplotters.

* With G-Series course computer corepacks only.

Make crosstrack error a thing of the past. Use your inboard pilot with a Raymarine GPS to track straight to your next waypoint.

Course computer features

- Complete all-in-one autopilot options.
- Patented external fluxgate compass for optimum performance and course keeping accuracy.
- SeaTalk networking.
- Simple installation – fixes with two screws.
- Connects to ST6002/ST7002/ST8002 control heads and ST290 keypads.
- Easy access enclosure.
- Speed connectors for wiring.
- G-Series option or upgrade option.
- Current limiting protection.

S1 System packs available for sail, hydraulic sterndive versions – talk to your Raymarine dealer.

Page 93 for product specifications

Rate Gyro enhanced S1G/S2G/S3G SmartPilots with Advanced Steering Technology (AST)
SmartPilot corepacks with built-in Rate Gyro bring autopilot performance to a new level. The Rate Gyro enables Raymarine's Advanced Steering Technology (AST) software to intelligently monitor the yaw of the vessel and actually anticipates course changes. A specially developed course control algorithm then delivers razor sharp course keeping without instability or overshoot. This gyro enhanced autopilot performance and advanced software is especially valuable in difficult steering situations, such as downwind with a following sea. Raymarine's AST software also enables Rate Gyro equipped SmartPilots to 'AutoLearn' the vessels steering characteristics, simplifying calibration and allowing the autopilot to constantly 'adapt' to changing sea conditions.

Step 3. Choosing Your Control Head

The final step to building a Raymarine SmartPilot system is selection of an autopilot control head. Here the decision is a matter of personal choice since each fixed-mount SmartPilot control head will offer the same level of autopilot performance. Adding additional control heads is easy thanks to Raymarine's SeaTalk networking.

CONTROL HEADS	ST6002	ST7002	ST8002	S100	SMARTCONTROLLER
Control type	Push button	Push button	Rotary knob	Push button	Push button
LCD size	81 mm	98 mm	98 mm	–	–
Character size	18 mm	30 mm	30 mm	8 mm	16 mm
Customisable SeaTalk data pages	7	15	15	No	8
Power steer mode	No	No	Yes	No	No
AST and AutoLearn with 'G' corepack	Yes	Yes	Yes	AST Only	AST Only
Optional second or multi-station control heads	Yes	Yes	Yes	Yes	Yes
Mounting	Flush or surface	Flush or surface	Flush or surface	Cradle/belt clip	Cradle/belt clip
Full calibration	Yes	Yes	Yes	No	No

Page 92 for product specifications

ST7002 Control Head

A powerful and versatile large control unit, the ST7002 is really simple to use. Its large informative display and intuitive keypad provide quick and easy access to all autopilot information as well as up to 15 pages of selectable instrument and navigation data pages. Ideal for longer passages, the response function controls the way the pilot helms the boat, ensuring the most comfortable ride at all times while keeping you right on course.

Features

- Large crisp LCD display with easy-to-read rudder angle indicator.
- Simple setup and calibration with AutoLearn when used with 'G' corepacks.
- A versatile data repeater with 15 configurable instrument/ navigation data pages.
- Remote ST60+ instrument control feature allows control of ST60+ instrument displays from the ST7002 keypad.
- Intuitive keypad and the proven Autohelm button control.
- Programmable AutoTack control.
- Surface mount (standard) or optional flush-mount fascia.
- Compatible with all SmartPilot corepacks and drive units.
- Dedicated controls for response, resume and set course.

ST6002 Control Head

The updated ST6002 control head is perfect when space is limited, its clear LCD display with up to 15 SeaTalk data pages allows you to monitor important navigational data.

Features

- Compact and stylish control head matches Raymarine ST60+ as well as E Series and C Series multifunction displays.
- Easy to read high-contrast display.
- Simple setup and calibration with AutoLearn when used with 'G' corepacks.
- A versatile data repeater with 15 configurable instrument/navigation data pages.
- Intuitive Autohelm pilot controls.
- Rudder angle indicator.
- Programmable AutoTack control.
- Surface mount (standard) or optional flush-mount fascia.
- Compatible with all SmartPilot corepacks and drive units.
- Available in convenient preconfigured SmartPilot system packs (with corepack and drive unit) for sail and power applications.

ST8002 Control Head

Simply dial in your destination and press AUTO. The ST8002 puts total helm control at your finger tips with an easy-to-use rotary control for precise course changes and power-steering control. The large LCD displays large high-contrast characters of pilot status, compass heading and user defined pages, transforming the ST8002 into a versatile navigation instrument repeater display.

Features

- Large crisp LCD display with easy-to-read rudder angle indicator.
- Simple setup and calibration with AutoLearn when used with 'G' corepacks.
- A versatile data repeater with 15 configurable instrument/navigation data pages.
- Programmable AutoTack control.
- Available in convenient preconfigured SmartPilot system packs (with corepack and drive unit) for sail and power applications.
- Compatible with all SmartPilot corepacks and drive units.
- Power Steer mode.

Typical Display Layout
With individual elements described.

S100 Wireless Autopilot Remote

S100 Wireless Autopilot Remote
The compact S100 gives you basic, on-board wireless control of any Raymarine SeaTalk autopilot, even if you're below deck and out of sight of your autopilot.

Easy operation and intuitive menu structure for easy access to all features. The S100 is powered by two AAA alkaline batteries.

- Wireless autopilot controller.
- Plug and Play – easy installation in just a few minutes.
- Latest and most reliable wireless technology (IEEE 802.15.4).

Display Features
- Two lines of text.
- Crisp, high contrast 24 x 127 dot matrix display.
- Signal strength indicator.
- Graphical illustration of autopilot mode selected.
- Raised profile on Standby button for easy nightime identification.

Networking Features
- Wireless up to 10m (32') from base station.
- Warning signalled when the remote is out of range of the base station.
- Pre-registered – each unit leaves the factory already registered to the base station.
- Add additional base stations for extended range.
- Add handsets for additional users and customise for individual preferences.

GOTO Page 94 for product specifications

TECHTIP

Both the S100 and SmartController are compatible with all Raymarine SeaTalk autopilots.

What's in the box

The S100 or SmartController wireless remote plus:
- Base station.
- SeaTalk lead (includes 3-way terminal).
- Two mounting cradles.
- Lanyard.
- Belt clip.
- AAA batteries (S100).
- NiMH batteries (SmartController).

SmartController Wireless Remote

SmartPilot Wireless Remote
Take full, on-board control of your Raymarine SeaTalk autopilot with the wireless SmartController. Wireless operation means freedom to monitor vital information when you're on deck or out of sight of your instruments.

Lightweight and compact for easy handling, the SmartController is a breeze to use thanks to its intuitive interface.

Display Features
- Eight user-definable pages show one, two or four lines of text and graphics including rolling road for cross track error.
- Crisp, high contrast 64 x 127 pixel dot matrix display.
- Raised profile on Standby button for easy nightime identification.
- Keylock security.
- Backlit buttons.
- Battery and signal strength indicator.
- Warning when the remote is out of range of the base station.
- Display of local and system alarms.

Network Features
- Wireless, full function autopilot controller*.
- Wireless SeaTalk instrument repeater.
- Plug and Play – easy installation in just minutes.
- Latest and most reliable wireless technology (IEEE 802.15.4).
- Wireless range up to 10m (32') from base station.
- Rechargeable via SeaTalk network.
- Add additional base stations for extended range.
- Add handsets for additional users and customise for each individual.

* Does not calibrate pilot – use ST6002/ST7002/ST8002 control heads.

GOTO Page 94 for product specifications

S1000 Inboard Autopilot with Wireless Remote

The above diagram shows the S1000 entry level autopilot and its component parts.

1. S1000 course computer
2. S100 wireless remote
3. SDGPS antenna (not supplied)
4. Hydraulic pump (connected to steering hydraulic system)
5. SeaTalk and NMEA connections
6. Power supply

What's in the box...

- Installation video – watch before you fit.
- Wireless S100 handheld controller with lanyard, belt clip and 2x storage cradles.
- Easy-install S1000 course computer.
- Hydraulic pump supplied pre-assembled with swaged hydraulic hoses.
- Bleed kit: oil, container, gloves, wrenches and connectors.

Do you.....

- Need an 'extra pair of hands'?
- Want to reduce fatigue on long journeys out to a favourite fishing spot?
- Want better fuel economy and shorter routes to waypoints?
- Have a powerboat typically 7.7m (25') or under with a balanced hydraulic system?

Yes? then this is the autopilot for you

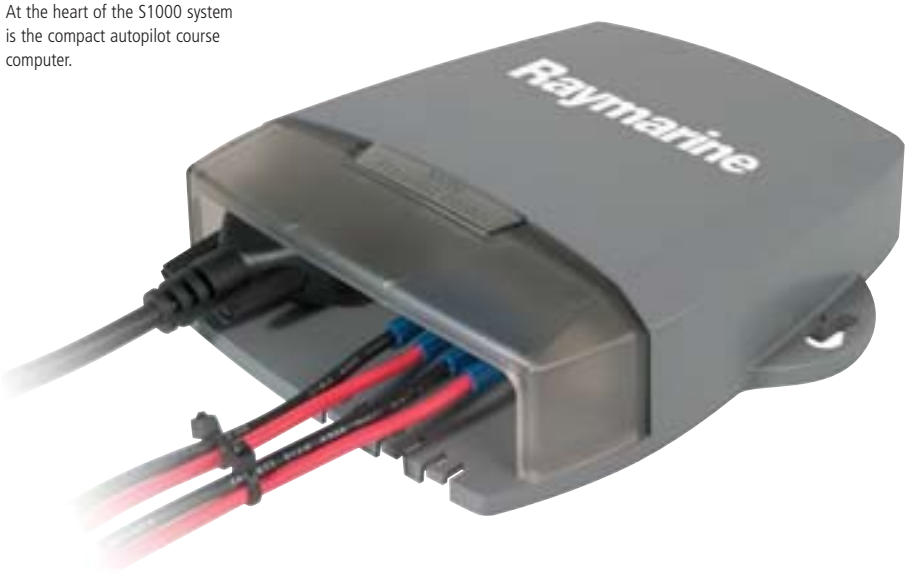
The S1000 'all-in-the-box' autopilot is for powerboats with balanced hydraulic systems (see **www.raymarine.com** for steering system compatability). Complete with everything needed for easy installation, the S1000 is quick to fit and simple to use. No added complications from electronic compass or rudder reference transducers – the S1000 doesn't need them.

Control the S1000 autopilot with the S100 wireless remote; simply steer on to your desired heading, press PILOT to engage the pilot in to auto and off you go. To adjust your heading at any time, simply press the port/starboard arrow keys until the heading you want is displayed. To disengage the pilot, press STANDBY – that's all there is to it!

S1000 Features

- A 'back to basics' point and shoot autopilot.
- Designed for balanced hydraulic systems.
- No electronic compass or rudder reference transducer needed.
- NMEA input from handheld or fixed GPS/ Navigator/Plotter.
- Built-in fishing patterns include cloverleaf, zig-zag and circle.
- Troll at speeds as low as 1 knot (subject to environmental conditions).
- Can be linked to kicker motor.
- SeaTalk GPS/Plotter compatible.

At the heart of the S1000 system is the compact autopilot course computer.



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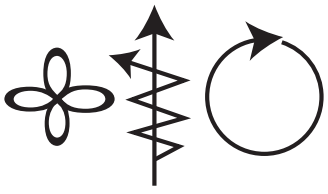


Fishing Patterns

The S1000 incorporates a number of dedicated fishing patterns. Patterns include: Cloverleaf, Zig Zag and Circle.

Smartpilot IPS Autopilot for Volvo Penta IPS Drive Systems

Designed to integrate with the innovative Volvo Penta IPS propulsion system, the Raymarine SmartPilot IPS represents the convergence of autopilot and propulsion technology. Employing Raymarine's proven AST (Advanced Steering Technology), the SmartPilot IPS delivers razor sharp course keeping and smooth course turns, in conjunction with the Volvo IPS 'steer by wire' propulsion system. CAN Bus communication protocols, provides the SmartPilot IPS with single cable interface to Volvo IPS drives. Raymarine's proven SeaTalk technology provides boat owners with their choice of multiple SmartPilot control heads as well as seamless integration with Raymarine's multifunction displays and instrument systems.

- Steer-By-Wire Technology.
- Simplified CAN Bus Autopilot Interface.
- Advanced Steering Technology (Smartpilot AST).

Note: Volvo Penta Interface required.

Smartpilot for Verado Outboard Engines

This Smartpilot is a complete autopilot system designed specifically for boats equipped with single or twin Verado outboard engines.

- Complete autopilot system in one box – includes all hoses and hydraulic fittings.
- SmartPilot AST (Advanced Steering Technology) using a built-in rate gyro sensor.
- AutoLearn software automatically learns the handling characteristics of your boat for optimal steering control.
- Wireless ready/optional wireless autopilot controls available.
- Seamless integration with Raymarine multi-function displays and instruments.
- Rate Gyro stabilised heading output for MARPA and radar/chartplotter overlay on Raymarine multi-function displays.
- Professional installation recommended.
- No rudder reference required.

NOTE: The Smartpilot system for Verado outboard engines is not suitable for use with parallel cylinder applications. Consult your Raymarine dealer, or goto **www.raymarine.com** for complete compatibility information.

What's in the Smartpilot Verado box

Raymarine Smartpilot for Verado outboard engines is a complete autopilot system in a box consisting of: course computer, control head, fluxgate compass, hydraulic drive, hydraulic hoses, adaptor and all fixtures.

GOTO Page 101 for product specifications

Marine Communications: Hear the difference

Dependable communications = peace of mind. Raymarine's communications systems combine innovative state-of-the-art technology with robust waterproof construction, designed to withstand life at sea.

Our radios feature single or multi-station VHFs, Class D DSC (Digital Selective Calling), SeaTalk and NMEA connectivity. Whether blue water cruising or fishing inshore, Raymarine have what you need for communication safety at sea.

What is DSC? Digital Selective Calling (DSC) is a global protocol that uses channel 70 (156.525 MHz) to transmit and receive digital messages. It works on DSC equipped VHF radios and is used for individual, 'all ships' and distress calls. DSC VHF radio users can digitally contact other DSC equipped vessels eliminating unnecessary VHF radio traffic and improving efficiency of ship-to-ship communication.

DSC safety digital Mayday. If you are unfortunate enough to find yourself having to make a Mayday call, the last thing you need is extra complication. Making a DSC distress call is simple with Raymarine's DSC equipped VHFs. Just press the clearly marked button and GPS position and time information are transmitted in a digital 'packet' complete with the vessel's Maritime Mobile Station Identifier (MMSI) telling other ships and shore stations exactly where you are and that you are in a distress situation. This simple procedure can dramatically increase your chance of a successful rescue compared to a traditional Mayday voice call.

RAY240E: Class D-DSC VHF radio

Ray240E the combination VHF radio and Class D-DSC communications system designed for easy integration with Raymarine products.

The Ray240E system operates from a waterproof cell phone style handset, has a loudspeaker for exterior or interior use, and a base station that can be mounted out of sight.

DSC (Digital Selective Calling) – easier and quicker than traditional Channel 16 calling, DSC calls other DSC users (vessels or shore stations) direct. Key in the MMSI (Maritime Mobile Service Identity) number (or pull up the 'phone style contacts list), select your VHF working channel and send – it's like using a cell phone. Both calling and receiving radios automatically switch to the chosen channel for communication.

DSC Distress Call – don't panic! it's easy. Press the distress button on the back of the waterproof handset, and your boat's details (MMSI number), position (using a GPS input) and time of call are automatically transmitted.

Optional Second Station with intercom facility – add a second handset and speaker for full function VHF and DSC communication on each handset and an intercom between stations.

Hailer and foghorn facility – add a hailer horn (option) to the built-in programmable auto fog alert and multiple siren alert tones to turn your 240E into a VHF hailer foghorn combination.

DSC Position Request – polls other DSC equipped vessels and displays their position on the handset screen. Interface the 240E with a compatible chartplotter for a DSC 'pop up' alert, making it easy to navigate to another vessel's transmitted position, be it a friend's boat or a 'digital mayday' location.

Ray240E Features

Submersible IPX-7 handset with easy button operated radio controls plus a slide down cover that protects a familiar phone-style alphanumeric keypad.

- Easy-to-read backlit display.
- Programmable scan and tri-watch function.
- Loudspeaker with on/off switch and volume control.
- Digital Position Request.

The Ray240E VHF radio is supplied with a powered external loudspeaker for call monitoring.

A dedicated distress button is located on the rear of the handset behind a flip panel.

Easy to read large backlit display

Button operated radio controls

Programmable Tri-Watch and Scan functions

Slide down cover protects the phone-style alphanumeric keypad

2 Year Raymarine Warranty

GOTO
Page 102 for product specifications

RAY101E: Handheld VHF Radio

2 Year Raymarine Warranty

GOTO
Page 103 for product specifications

Rugged and reliable, the Ray101E offers best-in-class Nickel Metal Hydride (NiMH) battery technology with 1300mA capacity. Easy left or right hand operation with backlit keys and crisp large LCD display. Supplied with 6x NiMH rechargeable cells, quick charger, charger base, wrist strap and belt clip.

Features

- Large high-contrast LCD display.
- Backlit keys and backlit LCD display.
- Rapid drop-in charger and Nickel Metal Hydride batteries for charging at anytime.
- Battery tray accepts both AA size NiMH and Alkaline batteries.
- 6 AA size NiMH batteries included.
- No expensive proprietary battery packs required.
- 12v cigarette lighter adapter included.
- Wrist strap and cell phone style belt clip included.
- Quick access 16 Plus priority key.
- Tri-watch.
- Rotary volume and squelch controls.
- 2 year limited warranty.
- IPX7 waterproof standard: submersible to 1 metre for at least 30 minutes.

RAY430: Loudhailer

Loudhailer, foghorn and intercom. Make yourself heard!

The Ray430 loudhailer has eight foghorn signals, including an automatic foghorn when underway. Connect it to a vessel security system for an extra loud alarm siren if a sensor is activated, or add up to four remote intercom stations for complete onboard communications. 30 watts of output power means you will be loud and clear!

The drop-in Ray101E rapid battery charger.

2 Year Raymarine Warranty

GOTO
Page 104 for product specifications

RAY54E: Fixed Mount DSC VHF Radio

Alongside popular VHF features such as extra large display, rotary channel knob, memory scan, weather channels, dual and tri-watch and 16 Plus, the Ray54E can also transmit vital emergency information including your boat identification, position and time of the distress call (requires NMEA data from your GPS).

The Ray54E has a powerful built in speaker for excellent audio quality and is available in Charcoal Grey or White.

Features

- Large 60 x 30mm LCD display.
- Large channel number characters (28mm).
- Four-line GPS data in addition to large channel number.
- Powerful built-in speaker for excellent audio quality.
- Channel change, 16 Plus and HI/LO power controls built into microphone.

Dedicated 16 Plus and hail buttons on the fist microphone.

16 Plus and a dedicated distress key can also be found the main facia.

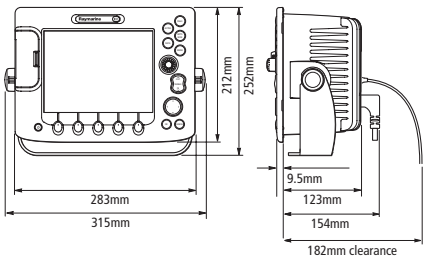
The RAY54E is also available in white.

2 Year Raymarine Warranty

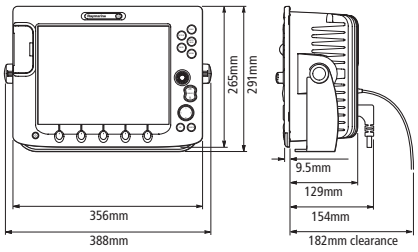
GOTO
Page 103 for product specifications

Multifunction Network Displays

GENERAL	E80 8.4" MULTIFUNCTION NETWORK DISPLAY	E120 12.1" MULTIFUNCTION NETWORK DISPLAY
Power:		
Nominal voltage (volts DC)	12V and 24V systems	12V and 24V systems
Absolute voltage range (volts DC)	10.7 – 32 volts	10.7 – 32 volts
Power consumption (typical) watts	20W (full brightness)	32W (full brightness)
Physical:		
Overall dimensions (WxHxD) mm	refer to diagram	refer to diagram
Product weight kg (lbs)	4.18 (9.2)	7.35 (16.2)
Mounting methods	flush or bracket	flush or bracket
Display size and type	213mm (8.4") colour LCD	307mm (12.1") colour LCD
Display resolution	640x480 (VGA)	800x600 (SVGA)
Display lighting	high brightness direct sunshine visible/night mode	high brightness direct sunshine visible/night mode



E80



E120

E SERIES PART NUMBERS

E02011	E80 8.4" Multifunction Network Display
E02013	E120 12.1" Multifunction Network Display

OPTIONS PART NUMBERS

E32042	Raystar125 SD GPS receiver
E63069	DSM300 Digital Echo Sounder
E52079	RD218 2kW 18" Radome
E52080	RD424 4kW 24" Radome
E52065	RD218 2kW 18" Radome with 15m cable
E52067	RD424 4kW 24" Radome with 15m cable
T52001-S	4kW 4' Radar Antenna (Open Array)
T52013-S	4kW 6' Radar Antenna (Open Array)
T52012-S	10kW 4' Radar Antenna (Open Array)
T52014-S	10kW 6' Radar Antenna (Open Array)
E55058	SeaTalk^{hs} network switch to network >2 devices
E55060	SeaTalk^{hs} crossover coupler for connecting 2 devices with no network switch
E55059	NMEA 0183 Multiplexer

Common E80/E120 Features

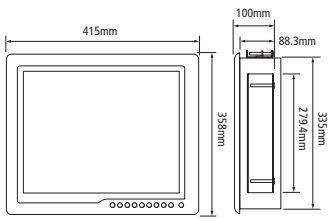
Connections:	
SeaTalk^{hs} networked port	✓
SeaTalk	✓
SeaTalk^{2}/NMEA 2000 port	✓
Pathfinder radar input	✓
Video input	S video (x2) or composite video (x4)
Video output VGA	(E Series 15" marine monitor)
NMEA 0183 input	✓
NMEA 0183 output	✓
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 95% @ 35°C non condensing
Waterproofing standard	IPX6 & CFR46
KEY FEATURES	
Display options	chart/radar/fishfinder/ CDI/data/video/engine
Display configurations	single/multi-function/custom
Display presentation	full, half or quarter screen
Data presentation	custom top or side bar/page option
Engine data	✓
Video input setup	fixed image/cycle option
Radar/chart orientation	head up/north up/ course up
Radar/chart overlay	✓
Variation source	auto/manual
Motion modes	relative/true
Waypoints	1200
Waypoint entry	graphical/Lat Lon/Brg Rng/TDs
Waypoint data	16 char/36 symbol comments
Waypoint storage	database in groups/CF card
Waypoint synchronisation	chart/radar/fishfinder
Active waypoint shown	local/via NMEA or SeaTalk
Waypoint transfer	via NMEA/compact flash card
Man overboard (MOB) mode	✓
Compass calibration	✓
Alarms	arrival/XTE/anchor/fix/ data loss/temp/depth/ guard zone/fish
Timers	alarm clock/countdown

GPS Features (requires GPS):	
Geodetic datum	WGS84 (or local)
Filters	3 levels for COG/SOG
Satellite differential control	on/off
Beacon differential control	auto/manual with Raymarine DGPS
Chartplotter Features:	
Multiple chart windows on screen	at independent ranges
Range scales/options	1/32 to 4000nm (19 scales)
Routes	✓ (150)
Waypoints per route	up to 50
Route storage	database/compact flash
SmartRoute (track to route)	✓
Tracks	10
Points per track	1000
Track intervals	auto optimised
Track storage	database/compact flash
Ruler	✓
Tidal information supported	via cartography
Sunrise/sunset predictions	via cartography
Navigation predictions	TTG/ETA
GOTO/follow functions	waypoint/cursor/route
Chart offset	✓
Off centre function (in relative motion)	✓
Auto range	✓
Chart object information	✓
Cartography set up control	layers/objects on/off
Radar Features:	
Multiple radar windows on screen	✓
Range scales (dependant on scanner)	11 scales (1/8 to 72nm)
Variable range marker (VRM)	2
Electronic bearing line (EBL)	2
Minimum range & discrimination	23m
Gain/tune	auto/manual
Clutter control	sea (with mode selection off)/rain/FTC
Interference rejection	normal/high
Guard zone	2
Off centre function	✓
Wakes	variable/off
Target expansion	low/high
Timed transmit	variable/off
MARPA Features (requires radar):	
Target tracking	10 targets
Selectable target vectors	✓
Target risk assessment/alarms/safe zone	✓
Target data and history	✓
Display options	radar/chart
Fishfinder Features:	
For details of multiple fishfinder windows on screen refer to DSM300 specs see page 80.	

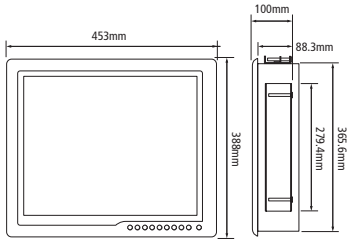
GOTO
Pages 12 – 17
for product information

G Marine Displays

GENERAL	
Power:	
Nominal voltage (volts DC)	12V and 24V systems
Absolute voltage range	10.7 – 32 volts DC
Power consumption (typical)	7.6 amps at 12V DC 3.5 amps at 24V DC
Physical:	
Dimensions (WxHxD) mm	G170: 415x358x100 / G190: 453x388x100
Product weight kg (lbs)	G170: 6.4 (14) / G190: 7.3 (16)
Mounting methods	panel
Environmental:	
Non-operating temperature range	-20°C to +70°C
Operating temperature range	-10°C to +50°C
Waterproofing standard	fascia waterproof to IPX6 standards when console mounted. Suitable for external console mounting (flybridge or open cockpit). The G170 and G190 are not designed for external yoke bracket mounting.
Approvals	
EMC (Europe and FCC)	✓
CE marked	✓
Display	
Display size (diagonal)	G170: 432mm (17") / G190: 483mm (19")
Backlighting	100 Levels
Inputs	3 analogue VGA inputs, 2 DVI inputs, 3 composite video inputs, 1 S-Video Input
Picture in picture	yes – 3 stages (child, split and wide screen)
Display resolution	SXGA 1280x1024 (supports higher resolutions to 1600 x 1200 pixels (UXGA) using a built-in scaler)
Display brightness*	G170: >1,000 cd/m² G190: >850 cd/m² (*ratings dependent on lighting conditions)



G170 17" MARINE MONITOR



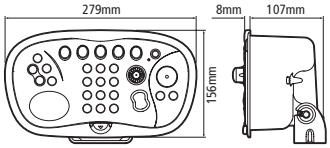
G190 19" MARINE MONITOR

G MARINE MONITORS	
E02036	G170: 17" Ultra Bright Marine Display
E02037	G190: 19" Ultra Bright Marine Display
E06021	DVI-D Cable (5m)
E55055	E Series Video Out Cable (10m)
E55056	E Series Video Out Cable (20m)

GOTO
Pages 18 – 19
for product information

SeaTalk² Keyboard

GENERAL	SEATALK² KEYBOARD
Power:	
Nominal voltage (volts DC)	powered via SeaTalk²
Power consumption (typical) watts	2W (fully backlit)
Physical:	
Overall dimensions (WxHxD) mm	279x156x107
Product weight kg (lbs)	0.8 (1.8)
Mounting methods	bracket or panel
Control type(s)	9 defined, 5 soft keys, 1 rotary knob + alphanumeric keypad
Cursor (context sensitive)	trackpad
Bezel options	black
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 95%
Waterproofing standard	CFR46
Connections:	
SeaTalk²	✓
Approvals:	
EMC(Europe and FCC)	✓
CE marked	✓



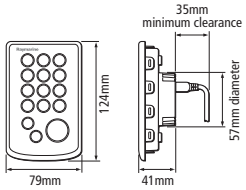
KEYBOARD

SEATALK² KEYBOARD	
E55061	SeaTalk² Navigation Keyboard

GOTO Page 20
for product information

Alphanumeric **Keypad**

GENERAL	ALPHANUMERIC KEYPAD
Power:	
Nominal voltage (volts DC)	12V systems (powered by SeaTalk)
Absolute voltage range (volts DC)	10 - 16 volts
Power consumption (typical) watts	60mA
Physical:	
Overall dimensions (WxDxH) mm	79x41x124
Mounting methods	flush/surface
Control type	14 dedicated keys plus trackpad
Connections:	
SeaTalk	✓
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 95%
Waterproofing standard	CFR46
KEY FEATURES (in conjunction with multifunction display)	
Rapid text entry	✓
Rapid number entry	✓
Remote menu control	✓



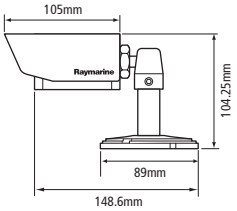
ALPHANUMERIC KEYPAD

ALPHANUMERIC KEYPAD	
E05008	Alphanumeric keypad

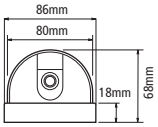
GOTO Page 24 for product information

Marine Video Cameras

Features:	CAM100 DAY & NIGHT VISION MARINE VIDEO CAMERA	CAM50 COLOUR DOME CAMERA
Overall dimensions (WxDxH) mm	refer to diagram	refer to diagram
Product weight kg (lbs)	0.28 (0.63)	0.31 (11oz)
Format	PAL (752x582 pixels)	PAL (500x582 pixels)
Imager	1/3 Sony Super HAD CCD (Super Hi Resolution)	1/3 Sony Super HAD CCD (Super Hi Resolution)
Horizontal Resolution	550TVL	380TVL
Scanning System	PAL 625 lines, NTSC 525 lines 2:1 Interlaced.	PAL 625 lines, NTSC 525 lines 2:1 Interlaced.
Video Output	Composite 75 Ohms	Composite 75 Ohms
Infra Red	14 IR LEDS	✗
LED Spectrum	30 degrees for 15m	✗
Min Illumination	0.1Lux at F2.0 (no IR), 0 Lux (with IR)	0.3Lux at F2.0 (no IR), 0 Lux (with IR)
Waterproof	IPX6 and CFR46	not suitable for external mounting
Power connection	12V tinned leads	12V tinned leads
Video connection	Male BNC.	Male BNC.
Power consumption	130mA Day, 280mA Night IR on, at 12V DC	80mA at 12V DC
Operating voltage	12DC (+30% -10%)	12DC (+30% -10%)
Operating Temperature	-15°C to +55°C	-10°C to +50°C
Storage Temperature	-25°C to +70°C	-25°C to +70°C
CE Mark	Self certification to EN 60945	Self certification to EN 60945



CAM100



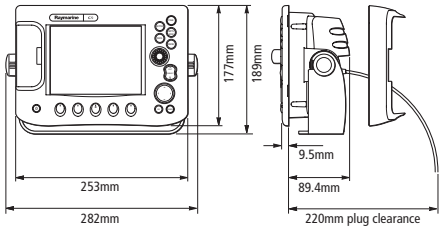
CAM50

MARINE VIDEO CAMERA PART NUMBERS	
E03007	CAM100 (NTSC) Camera for USA and Canada
E03006	CAM100 (PAL) Camera for Europe and ROW
E03021	CAM100 Reverse Image (NTSC)
E03020	CAM100 Reverse Image (PAL)
E03016	CAM50 (NTSC) Camera for USA and Canada
E03017	CAM50 (PAL) Camera for Europe and ROW
E03018	CAM50 Reverse Image (NTSC)
E03019	CAM50 Reverse Image (PAL)
E06017	5m camera extension cable
E06018	15m camera extension cable

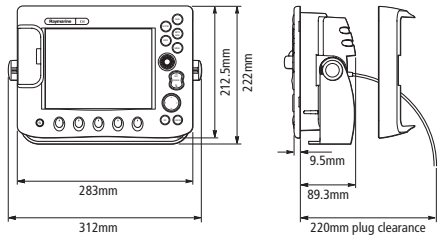
GOTO Page 21 for product information

Single Station **Multifunction Displays**

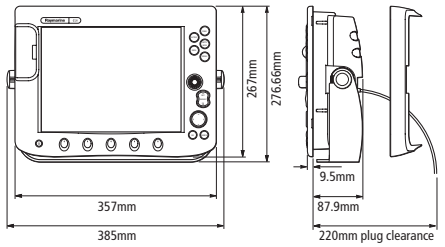
GENERAL	C70 6.5" MULTIFUNCTION DISPLAY	C80 8.4" MULTIFUNCTION DISPLAY	C120 12.1" MULTIFUNCTION DISPLAY
Power:			
Nominal voltage (volts DC)	12V, 24V systems	12V, 24V systems	12V, 24V systems
Absolute voltage range (volts DC)	10.7 – 32 volts	10.7 – 32 volts	10.7 – 32 volts
Power consumption (typical) watts	9W (fully backlit)	10W (fully backlit)	12W (fully backlit)
Power save option	variable (timed transmit on radar)	variable (timed transmit on radar)	variable (timed transmit on radar)
Physical:			
Overall dimensions (WxHxD) mm	refer to diagram	refer to diagram	refer to diagram
Product weight kg (lbs)	1.2 (2.6)	1.8 (3.9)	3.0 (6.6)
Mounting methods	flush or bracket	flush or bracket	flush or bracket
Control type(s)	9 defined keys, 5 soft keys, rotary control	9 defined keys, 5 soft keys, rotary control	9 defined keys, 5 soft keys, rotary control
Cursor (context sensitive)	trackpad	trackpad	trackpad
Display size and type	165mm (6.5") colour TFT LCD	213mm (8.4") colour TFT LCD	307mm (12.1") colour TFT LCD
Display resolution	640x480 (VGA)	640x480 (VGA)	800x600 (SVGA)
Display lighting	64 levels with day/night mode	64 levels with day/night mode	64 levels with day/night mode



C70



C80



C120

C SERIES PART NUMBERS

E02018	C70 6.5" Multifunction Display
E02020	C80 8.4" Multifunction Display
E02022	C120 12.1" Multifunction Display

GPS PART NUMBER FOR USE WITH C SERIES

E32042	Raystar125 SD GPS receiver

Common C70/C80/C120 Features

Connections:	
NMEA input (0183)	✓
NMEA output (0183)	✓
SeaTalk	✓
SeaTalk² (NMEA 2000 compatible)	✓
Radar input	✓
Digital sounder module input	✓
PC (RS232) and RayTech interface	via E85001
Cartography/archiving	Navionics Gold charts compact flash cards
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 95%
Waterproofing standard	IPX6 & CFR46
KEY FEATURES	
Display options	chart/radar/fishfinder/ CDI/data
Display configurations	single/multi-function/custom
Display presentation	full, half or quarter screen
Data information	custom top or side bar/page option
Radar/chart orientation	head up/north up/ course up
Radar/chart overlay	✓
Variation source (true/mag)	auto/manual
Motion modes	relative/true
Waypoints	1000
Waypoint entry	graphical/LatLon/ BrgRng/TDs
Waypoint data	16 character name/ 36 symbol options/ comments
Waypoint storage	database in groups/ compact flash card
Waypoint synchronisation	chart/radar/fishfinder
Active waypoint shown	local/via NMEA or SeaTalk
Waypoint transfer	via NMEA/compact flash card
Man Over Board (MOB)	✓
Compass calibration	✓
Alarms	arrival/XTE/anchor/fix/ data loss/temp
Timers	alarm clock/countdown

GPS Features (requires GPS):	
Geodetic datum	WGS84 (or local)
Filters	3 levels for COG/SOG
Satellite differential control	on/off
Beacon differential control	auto/manual with Raymarine DGPS
Radar Features (requires radar scanner):	
Multiple radar windows on screen	✓
Range scales (dependant on scanner)	11 scales (1/8 to 72nm)
Variable range marker (VRM)	2
Electronic bearing line (EBL)	2
Minimum range & discrimination	23m
Gain/tune	auto/manual
Clutter control	sea (with mode selection)/rain/FTC
Interference rejection	normal/high
Guard zone	2
Off centre function	✓ (in relative motion)
Wakes	variable/off
Target expansion	low/high
Chartplotter Features:	
Multiple chart windows on screen	at independent ranges
Range scales/options	1/32 to 4000nm (19 scales)
Routes	✓
Waypoints per route	up to 50
Route storage	database/compact flash card
Smart Route (track to route)	✓
Tracks	10
Points per track	1000
Track intervals	auto optimised plus time/ distance options
Track storage	database/compact flash card
Ruler	✓
Tidal information supported	via cartography
Sunrise/sunset predictions	via cartography
Navigation predictions	TTG/ETA
GOTO/follow functions	waypoint/cursor/route
Chart offset	✓
Off centre function (in relative motion)	✓
Auto range	✓
Chart object information	✓
Cartography set up control	layers/objects on/off
MARPA Features (requires radar):	
Target tracking	10 targets
Selectable target vectors	✓
Target risk assessment/alarms/safe zone	✓
Target data and history	✓
Display options	radar/chart
Fishfinder Features (requires digital sounder module):	
Refer to DSM300 specifications	

GOTO
Pages 22 – 25
for product information

RayTech RNS V6 Software

GENERAL

System requirements:	
Processor	Pentium IV 2GHz or equivalent
RAM memory	128MB minimum
CD Rom drive	✓
Operating system	Windows 2000/XP
Inputs	GPS NMEA or SeaTalk

Recommended system requirements:	
Processor	Pentium IV 2GHz or equivalent
Video	NVidia GeForce 4 video card or better
RAM memory	256MB or higher
Compass input	fluxgate heading via SeaTalk or NMEA

Interfaces:	
NMEA 0183 input/output	via RS232 serial 9 pin data cable
SeaTalk	via RS232 serial data cable through optional E85001 PC/SeaTalk interface
hsb²	hsb² interface kit required
C-MAP USB C-card reader	optional
Navionics USB multi-card reader	optional

Cartography supported:	
Navionics Gold/Navionics Platinum	via Navionics Compact Flash reader or SeaTalk^{hs} from E Series
C-Map NT/NT+ C-cards	via USB card reader or hsb² interface
C-Map NT/PC/NT+/PC	on CD-ROM installed via C-Map NT+/PC selector (included). Chart licenses purchased separately from C-Map
Raster cartography	BSB formatted nautical, topographical and aerial photo raster cartography: available from MapTech, Softchart, NDI, and others
C-MAP cartography sharing via hsb²	share cartography from C-MAP C-Cards or NT+/PC charts with hsb² Raycharts, hsb² radars, and hsb² echo sounders. Requires hsb² interface kit

Cartography supplied:	
Cartography	Maptech US planning charts, Softchart US planning charts, and C-Map planning cartography (approx. 1:600,000 scale)
Chart layering and merging	control raster and vector chart transparency
Tides and current data	worldwide tides and currents database
Sunrise/sunset predictions	✓
Seamless cartography	raster charts are 'quilted' together
Pathfinder radar overlay	requires hsb² kit
Weather data overlay	free 3 day forecast or advanced weather subscription (7 day forecast)
Head up/north up/course up	SeaTalk or NMEA compass input recommended
Night vision mode	auto/manual
True/magnetic variation source	auto/manual
DataTrak time based graphs	histogram plots of incoming data sources
Polar plots	polar data input and analysis tools

Navigation:	
Waypoints	unlimited
Waypoint name	16 character
Waypoint transfer	via hsb² or SeaTalk, NMEA, SeaTalk^{hs}, C-MAP card reader or Compact Flash
Routes	unlimited
Route name	16 character
Route optimisation	✓
Waypoints per route	up to 50
Tracks	unlimited
Points per track	unlimited
Track interval	time intervals
Alarms	✓
Ruler tool	✓
Navigation information	user defined databoxes
Navigation predictions	time to go/estimated time of arrival
GOTO/follow functions	waypoint/cursor/route

Radar:	
Interface	requires hsb² kit and any hsb² compatible radar system or SeaTalk^{hs} to E Series
VRM (Variable range marker)	2
EBL (Electronic bearing line)	2
Gain	auto/manual
Tune	auto/manual
Sea clutter & harbour/offshore mode	auto/manual
Rain clutter	on/off
Interference rejection	on/off
Wakes short,medium,long,off	✓
Target expansion	✓
MARPA	✓
Target tracking	10 targets
Selectable target vectors	✓
Target risk assessment	✓
History plots	✓
Danger alarms	✓
Target data box	✓

Echo sounder:	
Interface	requires hsb² kit and hsb² compatible echosounder or echosounder module or SeaTalk^{hs}
HD Digital Support	✓
Gain	auto/manual
Range control	auto/manual with shift
Zoom size	auto/manual x2,x4,x6
A-Scope	3 modes
Bottom lock	full/split adjust range
White line	✓
Scroll speed	auto/manual
VRM (Variable Range Marker)	✓

Additional features & display options:	
CDI (Course Deviation Indicator)	3D display
Data boxes	customisable
Radar display and radar/chart overlay	via hsb² (hsb² interface kit required)
Echosounder display	via hsb² (hsb² interface kit required) or SeaTalk^{hs}
Presentation modes	RNS mode, PC Windows or customisable

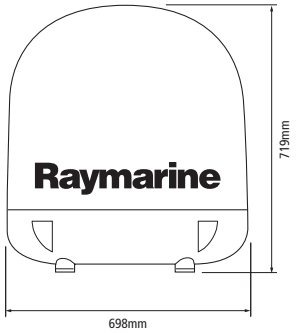
RAYTECH RNS V6 PART NUMBERS

E83040	RayTech RNS V6 navigation software (includes Navionics USB chart reader)
E83041	RayTech RNS V6 navigation software upgrade from V5.0
E86008	C-MAP USB chart reader
E86026	Navionics USB chart reader (includes RayTech planner cd)
E65009	3m USB – hsb² interconnect cable
E85001	PC/SeaTalk/NMEA interface box

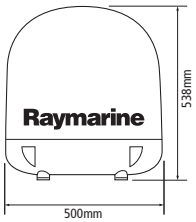
GOTO Pages 26-27 for product information

Satellite TV Antenna Systems

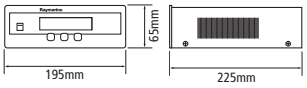
GENERAL	60STV	45STV
Power:		
Operating voltage	10.8–15.6 V DC	10.8–15.8 V DC
Power consumption	2A (40W typical)	2A (30W typical)
Physical:		
Overall dimensions (WxH) mm	698x719	500x538
Product weight kg (lbs)	20 (44)	14 (31)
Antenna dish diameter	600mm	450mm
Environmental:		
Operating temperature range	-40°C to +60°C (dish) -15°C to +55°C (ACU)	-40°C to +60°C (dish) -10°C to +55°C (ACU)
Storage temperature range	-40°C to +80°C (dish) -25°C to +70°C (ACU)	-40°C to +80°C (dish) -25°C to +70°C (ACU)
Warranty	2 years parts and 1 year labour	2 years parts and 1 year labour
PERFORMANCE		
Frequency	ku-band (10.7-12.75GHz)	ku-band (10.7-12.75GHz)
Antenna gain	@12.25 GHz 36dBi	@12.25 GHz 33dBi
Minimum EIRP (Effective Isotropic Radiated Power)	47dBW	50dBW
Azimuth range	680°	680°
Elevation range	5° to 90°	0° to 90°
Roll & pitch range	roll ±25° / pitch ±15°	roll ±25° / pitch ±15°
Roll & pitch tracking	45°/ second	50°/ second
Turn rate	45°/ second	50°/ second
Position repeatability	0.2° step acc. max	1.7° max pointing accuracy
Shock	27G, 11msec	27G, 11msec
LNB	universal quad LNB – Europe and Middle East dual LNB – Australia, China and New Zealand	dual output
Vibration	1G over 6-350Hz (60 sweeps)	1G over 6-350Hz (60 sweeps)



60STV ANTENNA



45STV ANTENNA



ANTENNA CONTROL UNIT

60STV	
E93007	60STV Satellite Television Antenna – Standard European Version
E93008	60STV Satellite Television Antenna – Premium European Version
E93011	60STV Satellite Television Antenna – Australia, China and New Zealand Version
E93012	60STV Satellite Television Antenna – Middle East Version

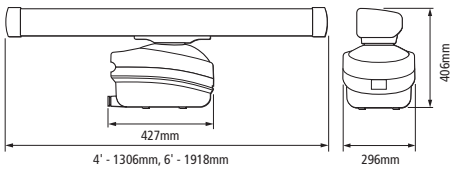
45STV	
E93003	45STV Satellite Television Antenna – European Version
E93004	45STV Satellite Television Antenna – Australia, China and New Zealand Version

GOTO Pages 28 – 29
for product information

Open Array Radar Scanners

GENERAL				
Scanner power, size and type	4kW 4' open array	4kW 6' open array	10kW 4' open array	10kW 6' open array
Power:				
Nominal voltage (volts DC)	12V, 24V, 32V systems	12V, 24V, 32V systems	24V, 32V systems	24V, 32V systems
Absolute voltage range (volts DC)	10.7 - 44 volts	10.7 - 44 volts	16 - 44 volts	20 - 44 volts
Power consumption (typical) watts	46W	46W	80W	80W
Power consumption (standby) watts	9.2W	9.2W	11W	11W
Power save option (timed transmit option)	✓	✓	✓	✓
Physical:				
Overall dimensions (mm)	pedestal: 427x296x406	pedestal: 427x296x406	pedestal: 427x296x406	pedestal: 427x296x406
	array length: 1306	array length: 1918	array length: 1306	array length: 1918
Product weight kg (lbs)	30 (66.2)	33.4 (73.7)	30 (66.2)	33.4 (73.7)
Mounting methods	4 stud	4 stud	4 stud	4 stud
Scanner cable length	15m standard	15m standard	15m standard	15m standard
	(25m option)	(25m option)	(25m option)	(25m option)
Approvals:				
EMC (R and TTE and FCC)*	✓	✓	✓	✓
CE marked	✓	✓	✓	✓
Environmental:				
Operating temperature range	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C
Non-operating temperature range	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%	up to 95%	up to 95%
Waterproofing standard	CFR46	CFR46	CFR46	CFR46
SCANNER FEATURES				
Max range scale	72nm	72nm	72nm	72nm
Transmitter frequency	9410 +/-30 MHz	9410 +/-30 MHz	9410 +/-30 MHz	9410 +/-30 MHz
Peak power output	4 kW	4 kW	10 kW	10 kW
Pulse length/PRF	8 (auto/target expand)	8 (auto/target expand)	8 (auto/target expand)	8 (auto/target expand)
Warm up time	70 seconds	70 seconds	70 seconds	70 seconds
Standby to transmit	<2.5 seconds	<2.5 seconds	<2.5 seconds	<2.5 seconds
Beam width horizontal -3dB	1.75°	1.25°	1.75°	1.25°
Beam width vertical -3dB	25°	25°	25°	25°
Polarisation	horizontal	horizontal	horizontal	horizontal
Antenna side lobes	<-22dB	<-25dB	<-22dB	<-25dB
Rotation rate	24rpm	24rpm	24rpm	24rpm
IF frequency	60MHz	60MHz	60MHz	60MHz
Receiver bandwidth	12/3/0.7/0.5MHz	12/3/0.7/0.5MHz	12/3/0.7/0.5MHz	12/3/0.7/0.5MHz

** FCC conforms to Part 80 (47CFR) and Part 2 (47CFR)*
CE conforms to 1995/5/EC, EN 60945.



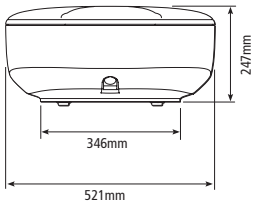
4' AND 6' OPEN ARRAY

OPEN ARRAY PART NUMBERS	
T52001-S	4kW scanner (pedestal, 4' array and 15m cable)
T52013-S	4kW scanner (pedestal, 6' array and 15m cable)
T52012-S	10kW scanner (pedestal, 4' array and 15m cable) (24V DC only)
T52014-S	10kW scanner (pedestal, 6' array and 15m cable) (24V DC only)
E55069	2.5m 90 Degree Split Pedestal Adaptor Cable - Open Array
E55075	5m 90 Degree Split Pedestal Cable - Open Array
E55063	15m 90 Degree Split Pedestal Cable - Open Array
E55064	25m 90 Degree Split Pedestal Cable - Open Array

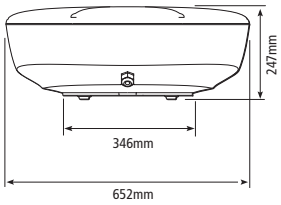
GOTO
Pages 32 – 33
for product information

Radome Radar Scanners

GENERAL		
Scanner power, size and type	2kW 18" radome	4kW 24" radome
Power:		
Nominal voltage (volts DC)	12V, 24V systems	12V, 24V systems
Absolute voltage range (volts DC)	10.8 - 32 volts	10.8 - 32 volts
Power consumption (typical) watts	28W	34W
Power consumption (standby) watts	9W	10W
Power save option (timed transmit option)	✓	✓
Physical:		
Overall dimensions (mm)	diameter 521x247	diameter 652x247
Product weight kg (lbs)	9 (19.9)	10 (22.1)
Mounting methods	4 bolts	4 bolts
Scanner cable length	15m standard (5m, 10m & 25m option)	15m standard (5m & 25m option)
Approvals:		
EMC (R and TTE and FCC)	✓	✓
CE marked	✓	✓
Environmental:		
Operating temperature range	-10°C to +55°C	-10°C to +55°C
Non-operating temperature range	-20°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%
Waterproofing standard	IPX6	IPX6
SCANNER FEATURES		
Max range scale	24nm	48nm
Transmitter frequency	9410 +/-30MHz	9410 +/-30MHz
Peak power output	2kW	4kW
Pulse length/PRF	8 (auto/target expand)	8 (auto/target expand)
Warm up time	70 seconds	70 seconds
Standby to transmit	<2.5 seconds	<2.5 seconds
Beam width horizontal -3dB	4.9°	4.0°
Beam width vertical -3dB	25°	25°
Polarisation	horizontal	horizontal
Antenna side lobes	<-23dB (outside 10°)	<-23dB (outside 10°)
Rotation rate	24rpm	24rpm
IF frequency	60MHz	60MHz
Receiver bandwidth	switchable 13/3/1/0.7MHz	switchable 13/3/1/0.7MHz



18" RADOME



24" RADOME

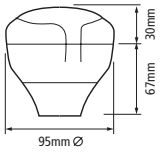
RADOME PART NUMBERS	
E52079	RD218 2KW 18" Radome
E52080	RD424 4kW 24" Radome
E52065	RD218 2kW 18" Radome with 15m cable
E52067	RD424 4kW 24" Radome with 15m cable

CABLE PART NUMBERS	
E55067	10m right-angled end Radome Cable (2kW Only)
E55068	15m right-angled end degree Radome Cable (2kW Only)
M92720	15m straight end Radome Cable (2kW Only)
E55074	5m right-angled end Radome Cable (2kW & 4kW)
E55065	15m right-angled end Radome Cable (2kW & 4kW)
E55066	25m right-angled end Radome Cable (2kW & 4kW)
M92668	15m straight end Radome Cable (2kW & 4kW)
M92669	25m straight end Radome Cable (2kW & 4kW)
E55071	5m 90 Degree Extension Cable
E55072	10m 90 Degree Extension Cable

GOTO Pages 32 – 33
for product information

Raystar125 SDGPS Antenna

GENERAL	RAYSTAR125 (NMEA OR SEATALK OPERATION)
Power:	
Nominal voltage (volts DC)	12V, 24V systems
Absolute voltage range (volts DC)	9 - 32 volts (NMEA version) 9 - 18 volts (SeaTalk version)
Power consumption (typical) watts	1.2W
Physical:	
Overall dimensions (DxH) mm	diameter 95x30
Product weight kg (lbs)	0.13 (0.29)
Mounting methods	flush/pole/rail
Cable length	10m (33')
Connections:	
NMEA input (0183)	NMEA version
NMEA output (0183)	NMEA version
SeaTalk	SeaTalk version
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +70°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 95%
Waterproofing standard	CFR46
GPS FEATURES	
Type	active antenna
Signal acquisition	12ch. parallel (C/A code)
Satellite differential type	WAAS/EGNOS/MSAS
Differential acquisition	automatic (satellite)
Beacon differential ready	with RTCM input
Position accuracy (RMS)	<15m
Position accuracy with SDGPS (RMS)	<5m
Speed accuracy (RMS)	<0.3kts
Time to first fix from cold start (typical)	<2.5min (<45sec)
Time to first fix (after initial cold start)	typically <8 seconds
Geodetic datum	WGS84 (190 programmable alternatives)



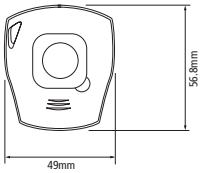
RAYSTAR125

GPS SENSOR	
E32042	Raystar125 SDGPS sensor

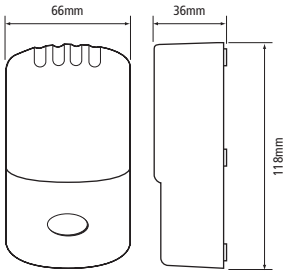
GOTO Page 33 for product information

LifeTag Man Overboard System

GENERAL	
Tag:	
Power	non-rechargeable CR2 3V lithium battery
Transmitted power	1mW
Dimensions (WxHxD) mm	49x56.8x24.4
Max. number of tags per system	16
Base Station:	
Power	8 – 16V DC external supply
Ancilliary switch output rating	200mA at supply voltage
Transmitted power	1mW
Base station range to tag range	typically 9m (30')
Dimensions (WxHxD) mm	66x118x36
Environmental:	
Operating temperature range	-15° to +55°C
Non-operating temperature range	-20° to +70°C
Humidity	up to 95%



LIFETAG

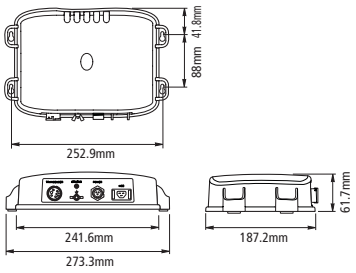


BASE STATION

LIFETAG PART NUMBERS	
E12185	LifeTag System – 2 LifeTags, Base Station and Alarm
E15026	An Additional LifeTag

GOTO Pages 30 – 31 for product information

DSM300 HD Digital Fishfinder Module



DSM300

GENERAL	
Power:	
Nominal voltage (volts DC)	12V and 24V systems
Absolute voltage range (volts DC)	10.7 – 32 volts
Power consumption (typical) watts	30W
Physical:	
Overall dimensions (LxWxD) mm	273x187x62
Product weight kg (lbs)	1.0 (2.2)
Mounting methods	bulkhead
Control types	via display
Display size and type	display dependant
Connections:	
	SeaTalk^{hs} - E Series
	hsb^2 - C Series
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 95%
Waterproofing standard	CFR46 and IPX6
KEY FEATURES	
Nominal output power	1000 or 600 watts (depends on transducer type)
Frequency	dual 200kHz/50kHz
Pulse length	100 µsec to 4 msec
Max. transmit rate	1580 pulses/min @ 50' range
Gain	auto/manual
Range scales	26 scales (2 to 1700m)
Range control	auto/manual with shift
Zoom size	auto/manual x2, x4, x6
A Scope	3 modes
Bottom lock	full/split (adjust range)
White line	✓
Background colour options	black, dark grey, light grey, white or blue. Two colour palettes and adjustable colour thresholds (green/CRT/Night vision)
Scroll speed	auto/manual
Fish symbols	✓
Variable range marker	✓
Alarms	fish/shallow/deep/temp

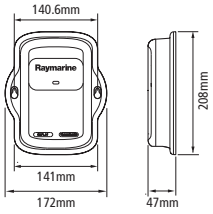
HD DIGITAL FISHFINDER MODULE PART NUMBER	
E63069	DSM300 HD Digital Fishfinder Module (supplied with 3m C Series hsb^2 cable)*

DSM300/hsb^2 FISHFINDER FAIRING BLOCKS AND TRANSDUCER ACCESSORIES	
FAIRING BLOCK(S)	
E66023	B744V / B744VL high speed fairing block
E66034	SS560/R99 high speed fairing block
OTHER ACCESSORIES	
E66009	3-metre transducer extension cable
E66010	5-metre transducer extension cable
R69011	Removable locking ring, nut & tool
E66022	Speed/temperature Y-cable adaptor
E66047	M256 / M260 transom mount bracket kit
E66050	M260 in-hull mounting bracket kit

* *SeaTalk^{hs}/hsb^2 cables for connection to E Series and C Series displays sold separately. See p105 for additional cables. For transducer options, go to p81 and/or* ***www.raymarine.com***

GOTO Page 37 for product information

DSM25 HD Digital Sounder Module (A65 only)



DSM25

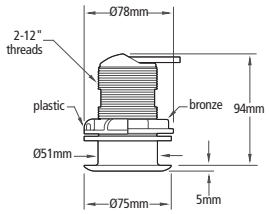
GENERAL	
Power:	
Supply	10.7 – 32 volts ext.
Physical:	
Dimensions (WxHxD) mm	172x208x47
Weight kg (lbs)	0.386 (0.85)
Approvals:	
CE marked	89/336/EEC (EMC), EN60945:2002
Environmental:	
Operating temperature	-10°C to +50°C
Storage temperature	-20°C to +70°C
Humidity	up to 95% at 35°C non-condensing
Waterproofing standard	IPX7
FEATURES	
Output power	adjustable to 500W RMS
Frequency	dual 50kHz and 200kHz
Pulse Length	100 µsec to 4 msec
Max. Transmit Rate	1580 pulses/min. @ 50' range
Gain	auto/manual
Transducer	Transom mount

DSM25 PART NUMBERS	
E63070	DSM25 HD Digital Sounder Module for A65 Display

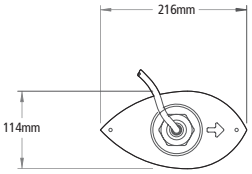
TRANSDUCER OPTIONS & ACCESSORIES	
E66061	B744V Bronze through hull with high speed fairing block (depth/speed/temp)
E66062	P58 transom mount depth/speed/temperature transducer
E66073	P74 In-hull/trolling motor transducer (depth/temp)
E66066	Transducer adaptor (enables connection of the DSM25 to DSM300 series transducers)
E66070	Transducer adaptor (enables connection of the DSM25 to legacy (L365/470) transducers

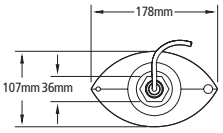
GOTO Page 38 for product information

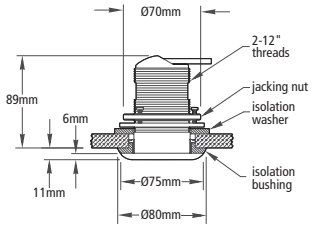
HD Digital **Fishfinder Transducer** Options



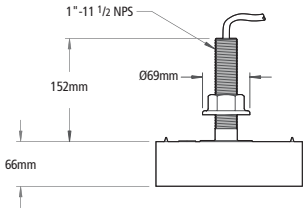
P319



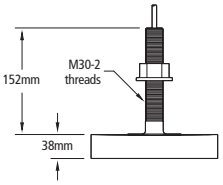




SS555



B260



B258

DEPTH TRANSDUCER(S) – 600W

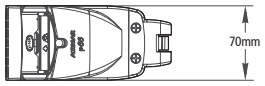
E66008	P79 adjustable in-hull angle
E66013	P319 low profile TH
E66014	B117 low profile TH
E66015	SS555 low profile TH

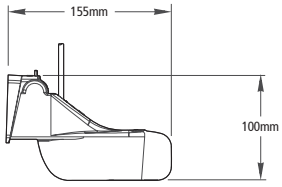
HIGH PERFORMANCE DEPTH TRANSDUCER(S) – 1KW

E66076	R199 in-hull

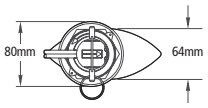
HIGH PERFORMANCE DEPTH/TEMPERATURE TRANSDUCER(S) – 1KW

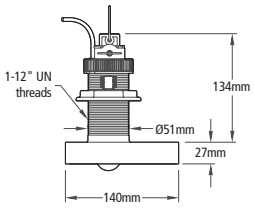
A66089	M260 transducer with in-hull kit
E66053	SS560 stainless steel TH including high speed fairing block
E66075	R99 CR dual frequency 2kW with high speed fairing block
E66079	B260 TH stem (includes E66034 fairing block)
E66080	SS560 TH transducer (includes fairing block)
E66082	B258 TH stem (includes E66025 fairing block)





P66





B744V

DEPTH/SPEED/TEMPERATURE TRANSDUCER(S) – 600W

E66054	P66 TM
E66056	B744V TH retractable (includes E66023 fairing block)
E66057	B744VL long stem TH (includes E66023 fairing block)

SPEED/TEMPERATURE TRANSDUCER(S)

E66019	ST69 TM (includes E66022 Y-cable)
E66071	ST800 low profile TH retractable (includes E66022 Y-cable)
E66072	B120/ST800 low profile TH retractable (includes E66022 Y-cable)

TRANSDUCER CROSS REFERENCE KEY:

V	Valve
L	Long Stem
TM	Transom Mount
TH	Through Hull
B	Bronze
P	Plastic
SS	Stainless Steel
CR	Cast Resin
CU	Cast Urethane

TRANSDUCER CABLE LENGTH: 10-METRE (30')

A65 Dualfunction Chartplotter/Fishfinder

GENERAL	
Display type	Colour TFT LCD
Display resolution	640 x 480 pixels (VGA)
Display size	165mm (6.5")

Power:	
Supply	External 10.7 –18VDC required, 13.8VDC nominal floating earth/fully isolated
Power Consumption	9W at full brightness

Physical:	
Dimensions (WxHxD) mm	244x173x61 dash mounted and 280x199x79 bracket mounted
Weight kg (lbs)	1.02 (2.25) dash mounted and 1.40 (3.09), bracket mounted

Approvals:	
FCC	Part 80 (47CFR) and Part 2 (47CFR)
CE marked	1999/5/EC, EN6095:1997

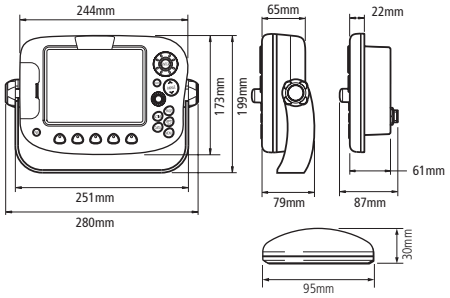
Environmental:	
Operating temp range	-10°C to +50°C
Non-operating temp range	-20°C to +70°C
Humidity	up to 95% @ 35°C non-condensing
Waterproofing standard	IPX7; suitable for external mounting

Connections:	3 pin POWER
	5 pin NMEA
	8 pin AUX
	8 pin SONAR
	6 pin GPS

Interfaces:	RS12 GPS antenna
	DSM25 sounder
	NMEA 0183, receive and transmit
	Compact Flash card slot
	Aux

Other Features:	
Controls	9 defined keys, 5 soft keys, trackpad and rotary control
Display Windows	chart, fishfinder and data
System Alarms	alarm clock, anchor, arrival, deep depth, MOB, offtrack, shallow depth, temperature, timer
Display Windows	chart, fishfinder and data
Screen functions	full and half screens available dependent on function
Cartography	Navionics Gold charts on Compact Flash cards, inbuilt chart of the world
Presentation Modes	Head up, Course up or North up (selectable true or magnetic), relative or true motion

RS12 SDGPS ANTENNA (FOR USE WITH A65 ONLY)	
Dimensions (WxHxD) mm	95x30 (x 62 with pole mount kit)
Weight kg (lbs)	0.435 (1.03)
Op/Storage Temp. Range	-10°C to 70°C (14°F to 158°F)
Waterproofing	CFR46
Receiver type	SD GPS, WAAS/EGNOS/MSAS ready, 12 parallel channels
Frequency	1575.42 MHz ±1 MHz (C/A code), L1
Sensitivity	tracking sensitivity: -152dBm
Acquisition sensitivity	-139dBm
Signal acquisition	automatic
Time to first fix (TTTF)	hot start < 6 seconds (typical); warm start < 40 seconds (typical), cold start < 60 seconds (typical)
Position accuracy	2DRMS – 2m 95%
Speed accuracy	0.1kts RMS
Geodetic datum	WGS84
Cable length	10m (33')



A65 PART NUMBERS

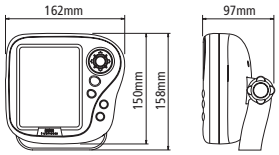
E33022	A65 Chartplotter/Fishfinder with RS12 GPS
E33024	A65 Chartplotter/Fishfinder with RS12 GPS, DSM25 (including Transom Mount Transducer)
E63070	DSM25 Digital Sounder Module for A65 Display*

** For DSM25 details go to page 38.*

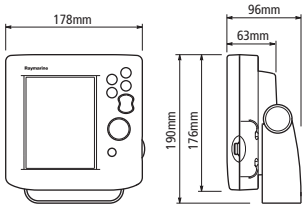
GOTO Pages 38 – 39
for product information

A Series Standalone **HD Digital Fishfinders**

GENERAL	DS500X	DS600X
Power:		
Nominal voltage (volts DC)	12V systems	12V systems
Absolute voltage range (volts DC)	10–18V DC	10–18 volts
Power consumption (typical) watts	10W	10W
Physical:		
Overall dimensions (including bracket) (WxHxD) mm	162x158x97	178x190x96
Overall dimensions (excluding bracket) (WxHxD) mm	162x150x78	176x178x64
Product weight kg (lbs)	0.68 (1.53)	0.85 (1.87)
Mounting methods	bracket or panel	bracket or panel
Control type(s)	5 defined keys	6 defined keys
Cursor (context sensitive)	trackpad	trackpad
Display size and type	127mm (5") TFT colour LCD	152mm (6") TFT colour LCD
Display resolution	320 x 240 (1/4 VGA)	320 x 240 (1/4 VGA)
Direct sunlight visibility	✓	✓
Backlighting	display and keypad	display and keypad
Connections:		
NMEA input (0183) (BWC, BWR, GLL, ZDA, RMB, VTG, HDG, HDT)	✓	✓
NMEA output (0183) (BWC, BWR, DBT, DPT, GLL, MTW, VHW, VLW, VTG, ZDA)	✓	✓
Approvals:		
EMC (Europe and FCC)	✓	✓
CE marked	✓	✓
Environmental:		
Operating temperature range	-10°C to +50°C	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%
Waterproofing standard	IPX7 (submersible)	IPX7 (submersible)
KEY FEATURES		
Nominal output power (RMS)	500W	500W
Frequency	dual 50/200kHz	dual 50/200kHz
Speed data	✓	✓
Trip & log data	digital/analogue	digital/analogue
Voltage data	✓	✓
Fish symbol feature	with fish depth indicator	with fish depth indicator
Zoom size	auto/manual x2, x3, x4	auto/manual x2, x3, x4
A-Scope	displays sonar returns in real time	displays sonar returns in real time
Bottom coverage indicator	digital display of the diameter of the seabed based on depth and transducer beam angle	digital display of the diameter of the seabed based on depth and transducer beam angle
Temperature display	digital/graphical	digital/graphical
Navigation display (requires GPS data via NMEA)	position, bearing and range to waypoint, SOG, COG, TTG and time	position, bearing and range to waypoint, SOG, COG, TTG and time
Colour palettes	6 colour schemes plus 3 separate background colour settings	6 colour schemes plus 3 separate background colour settings



DS500X



DS600X

A SERIES HD DIGITAL FISHFINDERS

E63064	DS500X digital fishfinder display
E63057	DS500X supplied with transom mount transducer
E63058	DS500X digital fishfinder supplied with bronze through-hull transducer
E63066	DS600X digital fishfinder display
E63059	DS600X digital fishfinder supplied with transom mount transducer
E63060	DS600X digital fishfinder supplied with bronze through-hull transducer

TRANSDUCER(S) / A SERIES PRODUCTS

Transducer Cable Length: 8-metre (25')	
E66061	B744V through-hull depth/speed/temperature transducer w/fairing block
E66062	P58 transom mount depth/speed/temperature transducer
E66073	P74 dual frequency trolling motor transducer, 500W-RMS 200/50Khz depth/temperature

TRANSDUCER ACCESSORIES / A SERIES PRODUCTS

E66066	Transducer adaptor cable / A Series to DSM250/hsb^2 transducers
E66070	Transducer adaptor cable / A Series to L365/470 transducer(s)
E66074	3m transducer extension cable (A Series)
R69080	Transducer connector kit

DISPLAY ACCESSORIES / A SERIES PRODUCTS

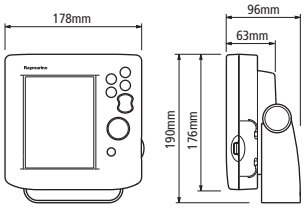
E66068	Flush-mount kit/DS500X
E32051	Flush-mount kit/DS600X
R69074	Power/NMEA cable (A Series fishfinders)

GOTO Page 41 for product information

GPS Standalone Chartplotters

GENERAL	RAYCHART 435i	RAYCHART 435
Power:		
Nominal voltage (volts DC)	12V system	12V system
Absolute voltage range (volts DC)	10 - 18 volts	10 - 18 volts
Power consumption (typical) watts	10W (fully backlit and GPS)	10W (fully backlit and GPS)
Physical:		
Overall dimensions (WxHxD) mm	186x176x62	186x176x62
Product weight kg (lbs)	0.85 (1.89)	0.85 (1.89)
Mounting methods	bracket or panel	bracket or panel
Control type(s)	6 defined keys	6 defined keys
Cursor (context sensitive)	trackpad	trackpad
Colour/mono	colour	colour
Display size and type	152mm (6") TFT colour LCD	152mm (6") TFT Colour LCD
Display resolution	320x240 (1/4 VGA)	320x240 (1/4 VGA)
Display lighting	4 levels (adjustable)	4 levels (adjustable)
Connections:		
NMEA input (0183) (WPL, RTE)	✓	✓
NMEA output (0183) (GGA, GLL, RMC, VTG, GSA, GSV, PRAYA, 6, XTE, BWR, RMB, APB, WPL, RTE)	✓	✓
Cartography	Navionics Gold	Navionics Gold
Approvals:		
EMC (Europe and FCC)	✓	✓
CE marked	✓	✓
Environmental:		
Operating temperature range	-10° to +70°C	-10°C to +70°C
Non-operating temperature range	-10° to +70°C	-10°C to +70°C
Humidity	up to 95%	up to 95%
Waterproofing standard	CFR46	CFR46
KEY FEATURES		
Range scales	1/8 to 4096nm	1/8 to 4096nm
Range options	16 scales	16 scales
Max. detail of background map	256nm with overzoom	256nm with overzoom
Head up/north up/course up	✓	✓
True/magnetic (variation source)	auto/manual	auto/manual
Waypoints	500	500
Waypoint name	8 character	8 character
Waypoint storage	database/CF card	database/CF card
Waypoint entry	graphical/manual	graphical/manual
Manual waypoint entry	LatLon	LatLon
Waypoint transfer	via NMEA	via NMEA
PC Waypoint transfer (via NMEA WPL sentence)	✓	✓
Routes	20	20
Route name	8 character	8 character
Route storage	database/CF card	database/CF card
Waypoints per route	up to 50	up to 50
Tracks	✓	✓
Points per track	1000	1000
Track interval	time/distance	time/distance
Smart Route (track to route)	✓	✓
Alarms	arrival/XTE/anchor/no fix	arrival/XTE/anchor/no fix
Timers	✗	✗
Navigation information	position/XTE/SOG/COG	position/XTE/SOG/COG
Navigation predictions	TTG/ETA	TTG/ETA
GOTO/follow functions	waypoint/cursor/route	waypoint/cursor/route
Tidal information supported	height and current via chart	height and current via chart
Sunrise/sunset predictions	✓	✓
Man Over Board (MOB)	✓	✓
GPS FEATURES		
Type	internal antenna	external antenna
Signal acquisition	12ch. parallel (C/A code)	12ch. parallel (C/A code)
Satellite Differential type	WAAS/EGNOS/MSAS	WAAS/EGNOS/MSAS
Differential acquisition	automatic	automatic
Position accuracy (RMS)	<15m	<15m
Position accuracy with SDGPS (RMS)	<5m	<5m
Speed accuracy (RMS)	<0.3kts	<0.3kts
Filters	dynamic filter depending on speed	dynamic filter depending on speed (SOG)
Time to first fix from cold start (typical)	< 3 min. (<90sec)	<3 min. (<90 sec)
Time to first fix (after initial cold start)	typically <15 seconds	typically <15 seconds
Geodetic datum	WGS84	WGS84 or local
Position correction	✓	✓
ADDITIONAL FEATURES and DISPLAY OPTIONS		
Course deviation indicator (rolling road)	✓	✓
Bearing and distance indicator	✓	✓
Data pages	3 full screen pages	3 full screen pages

** WAAS (Wide Area Augmentation System) has been operational since August 2000 and is available for navigation purposes in Canadian and US waters. EGNOS (European Geostationary Navigation Overlay System) is under development in Europe and should be used with caution until its official deployment sometime during 2006. MSAS (MTSAT ((Multifunction transport satellite)) Satellite-based Augmentation System), based in Asia, is also under development. SDGPS will be operational worldwide once these developments are complete. For more details, please visit* ***www.raymarine.com***



RC435 AND RC435I

GPS CHARTPLOTTERS	
E33019	Raychart 435i chartplotter with built-in GPS
E32040	Raychart 435 chartplotter complete with external GPS antenna

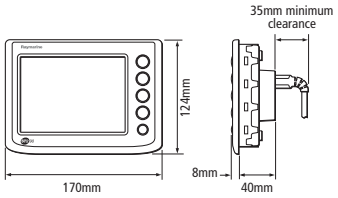
Page 40
for product information

ST290 Instruments

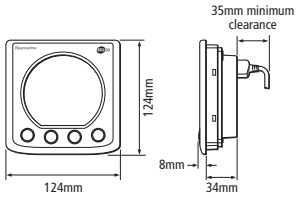
GENERAL		GRAPHIC DISPLAY	DATA DISPLAY
Power:			
Nominal voltage (volts DC)		12V systems	12V systems
Absolute voltage range (volts DC)		10 - 16 volts	10 - 16 volts
Power consumption (typical) mA		75mA (illumination off)	75mA (illumination off)
Physical:			
Overall dimensions (WxHxD) mm		170x124x46	170x124x46
Mounting methods		flush/surface	flush/surface
Control type(s)		5 backlit buttons	5 backlit buttons
Display size and type		140mm dot matrix LCD	140mm segmented LCD
Maximum character size		48mm	25mm
Display lighting		3 levels plus off	3 levels plus off
Connections:			
NMEA input (0183)		via DPU	via DPU
NMEA output (0183)		via DPU	via DPU
SeaTalk		via DPU	via DPU
SeaTalk² in/out (NMEA2000 via DPU)		2	2
PC (RS232) and RayTech interface option (via E85001)		via DPU	via DPU
Approvals:			
EMC (Europe and FCC)		✓	✓
CE marked		✓	✓
Environmental:			
Operating temperature range		-10°C to +70°C	-10°C to +70°C
Non-operating temperature range		-20°C to +70°C	-20°C to +70°C
Humidity		up to 95%	up to 95%
Waterproofing standard		IPX6 & CFR46	IPX6 & CFR46
DISPLAY-CHAPTERS AND PAGES			
Speed:	Speed data	current/max/average	current/max/average
	Speed range (knots)	0 to 60kts	0 to 60kts
	Log range (nm)	0 to 99999nm	0 to 99999nm
	Log options	total log and 5 trip logs	total log and 5 trip logs
	Speed alarms	high/low boat speed	high/low boat speed
	Speed units	knots/kph/mph	knots/kph/mph
	Velocity Made Good (VMG)	VMG to windward/WPT	VMG to windward/WPT
Depth:	Depth data	current/min/max	current/min/max
	Depth range (m)	0.8 to 180m (600')	0.8 to 180m (600')
	Depth offsets	keel/waterline/transducer	keel/waterline/transducer
	Depth alarms	shallow/deep/anchor	shallow/deep/anchor
	Depth units	metre/fathom/feet	metre/fathom/feet
	Depth trend arrows	✓	✓
Wind:	Wind speed data	apparent/true/max/ground	apparent/true/max
	Wind angle data	relative/apparent/true	relative/apparent/true
	Wind angle range	180° port and starboard	180° port and starboard
	Wind alarms	high/low wind speed/angle	high/low wind speed/angle
	Wind units	knots/mps/Beaufort	knots/mps/Beaufort
	Wind shift (head and lift)	✓	✓
	Docking wind relative to vessel plan	✓	✗
Heading:	Heading data	current/lock/next tack	current/lock/next tack
	Heading offset and variation	magnetic/true	magnetic/true
	Heading alarms	off course	off course
	Locked compass heading option	✓	✓
Navigation:	Latitude/Longitude	✓	✓
	Speed/course over ground (COG)	✓	✓
	Course/distance made good	✓	✓
	Waypoint data (WPT)	✓	✓
	Bearing/distance to WPT	✓	✓
	Estimated time of arrival/time to go (ETA/TTG)	✓	✓
	Cross track error (XTE)	✓	✓
	Course deviation indicator (rolling road)	✓	✗
	Route information	✓	✗
GPS:	GPS status (fix, no fix, D-fix)	✓	✓
Autopilot:	Autopilot control	with autopilot keypad	with autopilot keypad
	Autopilot status	✓	✓
	Gain and response control	✓	✓
	Full pilot calibration	✓	✗
	Steer bar indicator	✓	✗
Timers:	Local time and date	automatic via GPS + offset	automatic via GPS
	Alarm clock	✓	✓
	Stop watch	✓	✓
	Race timer	3x count down/up	3x count down/up
	Engine data monitoring	✓	✓
Information:	Water temperature	°C/°F	°C/°F
	Tide set/rate	✓	✓
	Sunrise/sunset/twilight time	✓	✓
	Position log	✓	✗
	Rudder angle indication	✓	✓
	Battery voltage	✓	✓
	Man Over Board (MOB) repeater	✓	✓
CUSTOM KEY FEATURES			
Various operating profiles		✓	✓
Configurable 'favourites' pages		✓	✓
Graphs		✓	✗
Transducer calibration		✓	✗
Adjustable display response time		✓	✓
System option supplied with transducer		pod only	✗
Instrument repeater		standard product	standard product
SYSTEM OPTIONS			
Man Over Board (MOB) keypad option		✓	✓
Extra loud external alarm		via DPU	via DPU
Compatible remote keypad options		remote	remote
Compatible autopilot keypad option		✓	✓
Custom data via RayTech		✓	✗

ST290 Instruments

GENERAL	ANALOGUE WIND	ANALOGUE CH WIND	ANALOGUE COMPASS	ANALOGUE RUDDER
Power:				
Nominal voltage (volts DC)	12V systems	12V systems	12V systems	12V systems
Absolute voltage range (volts DC)	10 - 15 volts	10 - 15 volts	10 - 15 volts	10 - 15 volts
Power consumption (typical) mA	65mA (illumination off)	65mA (illumination off)	65mA (illumination off)	65mA (illumination off)
Physical:				
Overall dimensions (WxHxD) mm	124x124x39	124x124x39	124x124x39	124x124x39
Mounting methods	flush/surface	flush/surface	flush/surface	flush/surface
Control type(s)	4 backlit buttons	4 backlit buttons	4 backlit buttons	4 backlit buttons
Display size and type	34mm segmented LCD	34mm segmented LCD	34mm segmented LCD	✗
Maximum character size	13mm	13mm	13mm	✗
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off	3 levels plus off
Connections:				
NMEA input (0183)	via DPU	via DPU	via DPU	via DPU
NMEA output (0183)	via DPU	via DPU	via DPU	via DPU
SeaTalk	2	2	2	2
SeaTalk² in/out (NMEA2000 via DPU)	via DPU	via DPU	via DPU	via DPU
PC (RS232) and RayTech interface option (via E85001)	✓	✓	✓	✓
Approvals:				
EMC (Europe and FCC)	✓	✓	✓	✓
CE marked	✓	✓	✓	✓
Environmental:				
Operating temperature range	-10°C to +70°C	-10°C to +70°C	-10°C to +70°C	-10°C to +70°C
Non-operating temperature range	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%	up to 95%	up to 95%
Waterproofing standard	IPX6 & CFR46	IPX6 & CFR46	IPX6 & CFR46	IPX6 & CFR46
DISPLAY-CHAPTERS AND PAGES				
Speed: Velocity Made Good (VMG)	VMG to wind	✓	✗	✗
Wind: Wind speed data	apparent/true/max	apparent/true/max	✗	✗
Wind speed range (knots)	0 to 60kts	0 to 60 knots	✗	✗
Wind angle data	apparent/true	apparent/true	✗	✗
Wind angle range	180° port and starboard	20° to 55° port and starboard	✗	✗
Wind alarms	high/low wind speed	✗	✗	✗
Wind units	knots/mps/Beaufort	knots/mps/Beaufort	✗	✗
Heading: Heading data	✗	✗	current/locked/average	✗
Heading offset and variation	✗	✗	magnetic/true	✗
Locked compass heading option	✗	✗	✓	✗
Navigation: Speed/course over ground (COG)	✗	✗	COG via GPS	✗
Information: Man Over Board (MOB) repeater	✗	✗	✓	✗
CUSTOM KEY FEATURES				
Low power indication	✓	✓	✓	✗
Adjustable display response time	LCD and pointer	LCD and pointer	LCD and pointer	✗
System option supplied with transducer	✓	✗	✗	✗
Instrument repeater	standard product	standard product	standard product	standard product
SYSTEM OPTIONS				
Man Over Board (MOB) keypad option	✗	✗	✓	✗
Extra loud external alarm	via DPU	✗	via DPU	✗



GRAPHIC AND DATA DISPLAY



ANALOGUE WIND, CLOSE HAULED WIND, COMPASS AND RUDDER DISPLAYS

ST290 SYSTEM PACK

T22071	Comprises: graphic display, data processing unit (DPU), speed pod, depth pod, system manual. Note: compatible speed/depth transducer must be ordered separately.

ST290 DISPLAYS

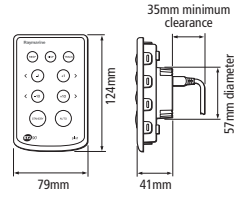
E22056	ST290 data display
E22057	ST290 graphic display
E22059	ST290 wind angle analogue display
E22061	ST290 CH wind analogue display
E22060	ST290 compass analogue display
E22062	ST290 rudder angle analogue display

ST290 speed and depth transducer options, see page 91.

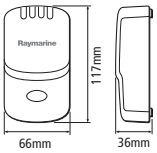
GOTO Pages 42 – 44 for product information

ST290 Instruments

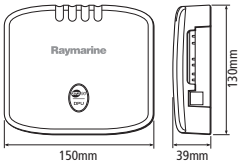
GENERAL	REMOTE MOB PILOT KEYPADS	DATA PROCESSING UNIT	TRANSDUCER PODS (SPEED, DEPTH, WIND)	SMART HEADING SENSOR
Power:				
Nominal voltage (volts DC)	12V systems	12V systems	12V systems	12V, 24V systems
Absolute voltage range (volts DC)	10 - 16 volts	10 - 16 volts	10 - 16 volts	10 - 32 volts
Power consumption (typical) mA	65mA (remote) 47mA (MOB) 58mA (pilot)	250mA	50mA	130mA
Physical:				
Overall dimensions (WxHxD) mm	78.5x124x41	150x130x39	66x117x36	150x130x39
Mounting methods	flush/surface	surface	surface	surface
Control type(s)	backlit buttons	✗	✗	x2 status LED
Connections:				
NMEA input (0183)	✗	✓	✗	✓
NMEA output (0183)	✗	✓	via DPU	✓
SeaTalk	2	✓	✗	✓
SeaTalk² in/out (NMEA2000 via DPU)	via DPU	✓	2	✗
PC (RS232) and RayTech interface option (via E85001)	✗	✓	✗	✓
Approvals:				
EMC (Europe and FCC)	✓	✓	✓	✓
CE marked	✓	✓	✓	✗
Environmental:				
Operating temperature range	-10°C to +70°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C
Non-operating temperature range	-20°C to +70°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C
Humidity	up to 95%	up to 80%	up to 80%	up to 80%
Waterproofing standard	IPX6 & CFR46	drip resistant	splashproof	drip resistant
SYSTEM OPTIONS				
Man Over Board (MOB) keypad option	standard product	✓	✗	✗
Extra loud external alarm	via DPU	✓	✗	✗
Compatible remote keypad options	standard product	✓	✗	✗
Compatible autopilot keypad option	standard product	✓	✗	✗



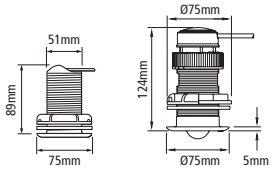
KEYPAD



TRANSDUCER POD



DATA PROCESSING UNIT (DPU)
AND SMART HEADING SENSOR



SPEED AND DEPTH TRANSDUCERS
ST60+ AND ST290 (TYPICAL)

ST290 KEYPADS

E12094	ST290 pilot keypad (button)
E22063	ST290 digital remote keypad
E22064	ST290 MOB keypad

ST290 TRANSDUCERS

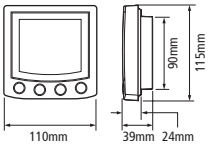
E12102	Smart heading sensor compass transducer
E22068	Active wind transducer system

ST290 speed and depth transducer options, see page 91.

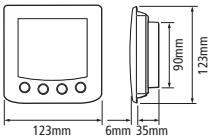
GOTO Pages 42 – 44
for product information

ST60+ Instruments

GENERAL	SPEED	DEPTH	WIND AND CH WIND	COMPASS
Power:				
Nominal voltage (volts DC)	12V systems	12V systems	12V systems	12V systems
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts	10 – 16 volts
Power consumption (typical) mA	45mA	45mA	65mA	65mA
Physical:				
Overall dimensions (WxHxD) mm (standard bezel)	110x115x39	110x115x39	110x115x39	110x115x39
Mounting methods	flush/surface/bracket	flush/surface/bracket	flush/surface/bracket	flush/surface/bracket
Control type(s)	4 backlit buttons	4 backlit buttons	4 backlit buttons	4 backlit buttons
Display size and type	92mm segmented LCD	92mm segmented LCD	34mm segmented LCD & pointer	34mm segmented LCD & pointer
Maximum character size	36mm	36mm	13mm	13mm
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off	3 levels plus off
Connections:				
NMEA input and output (0183)	option via E85001	option via E85001	option via E85001	option via E85001
SeaTalk	2 connections	2 connections	2 connections	2 connections
PC (RS232) and RayTech interface option (via E85001)	✓	✓	✓	✓
Approvals:				
EMC (Europe and FCC)	✓	✓	✓	✓
CE marked	✓	✓	✓	✓
Environmental:				
Operating temperature range	-15°C to +55°C	-15°C to +55°C	-15°C to +55°C	-15°C to +55°C
Non-operating temperature range	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
Humidity	up to 95%	up to 95%	up to 95%	up to 95%
Waterproofing standard	IPX6 & CFR46	IPX6 & CFR46	IPX6 & CFR46	IPX6 & CFR46
DISPLAY PAGES				
Speed data	current/max/average/SOG	✗	✗	✗
Speed range (knots) (transducer dependant)	0 to 60kts	✗	✗	✗
Log range (nm)	0 to 99999nm	✗	✗	✗
Trip range (nm)	0 to 999nm	✗	✗	✗
Speed units	knots/kph/mph	✗	✗	✗
Water temperature (transducer dependant)	-10°C to +40°C	✗	✗	✗
Depth data	✗	current/min/max	✗	✗
Depth range (m) (transducer dependant)	✗	0.8 to 180m (600')	✗	✗
Depth offsets	✗	keel/waterline/transducer	✗	✗
Depth alarms	✗	shallow/deep/anchor	✗	✗
Depth units	✗	metre/fathom/feet	✗	✗
Wind speed data	✗	✗	apparent/true/max	✗
Wind speed range (knots) (transducer dependant)	✗	✗	0 to 60kts	✗
Wind angle data	✗	✗	apparent/true	✗
Wind angle range	✗	✗	180° port and starboard	✗
Wind alarms	✗	✗	high wind speed (high/low/max)	✗
Wind units (wind only)	✗	✗	knots/ms/Beaufort	✗
Heading data	✗	✗	✗	current/locked/average
Heading offset and variation	✗	✗	✗	magnetic/true
Heading alarms	✗	✗	✗	off course
Locked compass heading option	✗	✗	✗	✓
Timers	stop/lap/countdown	✗	✗	✗
Transducer alignment and calibration (master only)	manual/via SOG	manual	manual	auto/manual
Man Over Board (MOB) repeater	✗	✗	✗	✓
Rudder angle indication	✗	✗	✗	✗
ADDITIONAL FEATURES	VMG (Velocity Made Good)	depth trend arrows	opposite tack mode	COG via GPS
	SOG via GPS	autopilot status	Close Haul (CH) option	'Soft' power down
	autopilot status	'Soft' power down	VMG available on CH	
	1/100knot resolution		magnified display on CH	
	'Soft' power down		compass rose on CL	
			'Soft' power down	
DISPLAY OPTIONS				
Low power indication	✗	✗	✗	✗
Adjustable display response time	✓	✓	LCD and pointer	LCD and pointer
System option supplied with transducer	✓	✓	✓	✓
Clip on bezel option	flush mount	flush mount	flush mount	flush mount



SURFACE



FLUSH

GOTO Pages 45 – 47
for product information

ST60+ Instruments

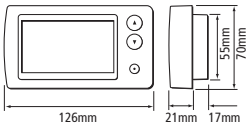
GENERAL	RUDDER ANGLE	TRIDATA	GRAPHIC REPEATER
Power:			
Nominal voltage (volts DC)	12V systems	12V systems	12V systems
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts	10 – 16 volts
Power consumption (typical) mA	45mA	45mA	50mA
Physical:			
Overall dimensions (WxHxD) mm (standard bezel)	110x115x39	110x115x39	110x115x39
Mounting methods	flush/surface/bracket	flush/surface/bracket	flush/surface/bracket
Control type(s)	4 backlit buttons	4 backlit buttons	4 backlit buttons
Display size and type	✗	92mm segmented LCD	92mm dot matrix
Maximum character size	✗	19mm	36mm
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off
Connections:			
NMEA input and output (0183)	option via E85001	option via E85001	✓
SeaTalk	2	2	2
PC (RS232) and RayTech interface option (via E85001)	✓	✓	✓
Approvals:			
EMC (Europe and FCC)	✓	✓	✓
CE marked	✓	✓	✓
Environmental:			
Operating temperature range	-15°C to +55°C	-15°C to +55°C	-15°C to +55°C
Non-operating temperature range	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
Humidity	up to 95%	up to 95%	up to 95%
Waterproofing standard	IPX6 & CFR46	IPX6 & CFR46	IPX6 & CFR46
DISPLAY PAGES			
Speed data	✗	current/max/average/VMG/SOG	current/max/average/SOG
Speed range (knots) (transducer dependant)	✗	0 to 60kts	0 to 60kts
Log range (nm)	✗	0 to 99999nm	0 to 99999nm
Trip range (nm)	✗	0 to 999.99nm	0 to 999.99nm
Speed units	✗	knots/kmh/mph	knots/kmh/mph
Water temperature (transducer dependant)	✗	-10°C to +40°C	-10°C to +40°C
Depth data	✗	current/min/max	current/min/max
Depth range (m) (transducer dependant)	✗	0.8 to 180m (600')	0.8 to 180m (600')
Depth offsets	✗	keel/waterline/transducer	✗
Depth alarms	✗	shallow/deep/anchor	repeater only
Depth units	✗	metre/feet	metre/fathom/feet
Wind speed data	✗	✗	apparent/true/max
Wind speed range (knots) (transducer dependant)	✗	✗	0 to 60kts
Wind angle data	✗	✗	apparent/true
Wind angle range	✗	✗	180° port and starboard
Wind alarms	✗	✗	repeater only
Wind units (wind only)	✗	✗	knots/ms/Beaufort
Heading data	✗	✗	current/locked/average
Heading offset and variation	✗	✗	magnetic/true
Heading alarms	✗	✗	repeater only
Locked compass heading option	✗	✗	repeater only
Timers	✗	stop/lap/countdown	date/time/timers
Transducer alignment and calibration	manual	manual/via SOG	✗
Man Over Board (MOB) repeater	✗	✗	✓
Rudder angle indication	✓	✗	✓
ADDITIONAL FEATURES			
Configurable 'favourites' pages	✗	✗	✓
Graphs	✗	✗	✓
Multi-line data formats	✗	fixed	various
CDI rolling road	✗	✗	✓
XTE steer bar	✗	✗	✓
VMG (Velocity made good)	✗	✓	✓
Trends	✗	depth arrows	arrows/graphs
GPS data	✗	✗	✓
Waypoint data	✗	✗	✓
Autopilot status	✗	✗	✓
'Soft' power down	✓	✓	✓
DISPLAY OPTIONS			
Low power indication	✗	✗	battery volts and alarm
Adjustable display response time	pointer	✓	✓
System option supplied with transducer	✓	✓	✗
Clip on bezel option	flush mount	flush mount	flush mount

ST60+ PART NUMBERS

A22004-P	ST60+ tridata display (digital)
A22013-P	ST60+ tridata system (digital)
A22017-P	ST60+ tridata repeater (digital)
A22002-P	ST60+ depth display (digital)
A22010-P	ST60+ depth system w/transducer (digital)
A22001-P	ST60+ speed display (digital)
A22009-P	ST60+ speed system w/transducer (digital)
A22005-P	ST60+ wind display (analogue)
A22011-P	ST60+ wind system analogue rotavector (power)
A22012-P	ST60+ wind system analogue vane (power/sail)
E22049-P	ST60+ clubhouse wind display
A22016-P	ST60+ clubhouse wind analogue system
E22075-P	ST60+ graphic display
A22006-P	ST60+ CH/VMG repeater display (analogue)
A22007-P	ST60+ compass display (analogue)
A22014-P	ST60+ compass system (analogue)
A22008-P	ST60+ rudder angle indicator display (analogue)
A22015-P	ST60+ rudder angle indicator system (analogue)
A22024	ST60+ remote keypad

ST40 Instruments

GENERAL	SPEED	DEPTH	WIND	COMPASS
Power:				
Nominal voltage (volts DC)	12V systems	12V systems	12V systems	12V systems
Absolute voltage range (volts DC)	10 - 16 volts	10 - 16 volts	10 - 16 volts	10 - 16 volts
Power consumption (typical) mA	25mA	30mA	25mA	20mA
Physical:				
Overall dimensions (WxHxD) mm	126x70x38	126x70x38	126x70x38	126x70x38
Mounting methods	surface or bracket	surface or bracket	surface or bracket	surface or bracket
Control type(s)	3 backlit buttons	3 backlit buttons	3 backlit buttons	3 backlit buttons
Display size and type	88mm segmented LCD	88mm segmented LCD	88mm segmented LCD	88mm segmented LCD
Maximum character size	28mm	28mm	17mm	17mm
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off	3 levels plus off
Connections:				
NMEA input and output (0183)	option via E85001	option via E85001	option via E85001	option via E85001
SeaTalk	✓	✓	✓	✓
PC (RS232) and Raytech interface option	✓	✓	✓	✓
Approvals:				
EMC (Europe and FCC)	✓	✓	✓	✓
CE marked	✓	✓	✓	✓
Environmental:				
Operating temperature range	0°C to +70°C	0°C to +70°C	0°C to +70°C	0°C to +70°C
Non-operating temperature range	-10°C to +70°C	-10°C to +70°C	-10°C to +70°C	-10°C to +70°C
Humidity	up to 95%	up to 95%	up to 95%	up to 95%
Waterproofing standard	CFR46	CFR46	CFR46	CFR46
DISPLAY PAGES				
Speed data	current/max/average	✗	✗	✗
Speed range (knots)	0 to 99.9kts	✗	✗	✗
Log range (nm)	0 to 99999nm	✗	✗	✗
Trip range (nm)	0 to 999nm	✗	✗	✗
Speed units	knots/kph/mph	✗	✗	✗
Water temperature	-10°C to +40°C	✗	✗	✗
Depth data	✗	current/min	✗	✗
Depth range (m)	✗	0.8 to 130m (0 – 400')	✗	✗
Depth offsets	✗	keel/waterline/transducer	✗	✗
Depth alarms	✗	shallow/deep/anchor	✗	✗
Depth units	✗	metre/fathom/feet	✗	✗
Wind speed data	✗	✗	apparent/true	✗
Wind speed range (knots)	✗	✗	0 to 60kts	✗
Wind angle data	✗	✗	apparent/true	✗
Wind angle range	✗	✗	180° port and starboard	✗
Wind alarms	✗	✗	high/true wind speed	✗
Wind units	✗	✗	knots/mps	✗
Heading data	✗	✗	✗	current/locked
Heading offset and variation	✗	✗	✗	magnetic/true
Heading alarms	✗	✗	✗	off course
Locked compass heading option	✗	✗	✗	✓
Alignment and calibration	manual/via SOG	manual	manual	manual
Man Over Board (MOB) repeater	✗	✗	✗	✓
DISPLAY OPTIONS				
Low power indication	✓	✓	✓	✓
Adjustable display response time	✓	✓	✓	✓
System option supplied with transducer	✓	✓	✓	✓



ST40 INSTRUMENT HEAD

ST40 INSTRUMENT SYSTEMS

E22043	ST40 speed through-hull system supplied with E26008 low profile speed transducer (cable length 9 metre / 30')
E22044	ST40 depth through-hull system supplied with E26009 low profile depth transducer (cable length 9 metre / 30')
E22045	ST40 bidata system supplied with E26008 & E26009 transducers (cable length 9 metre / 30')
E22047	ST40 wind system with Z195 rotavecta wind transducer (cable length 20 metre / 65')
E22048	ST40 compass system supplied with M81190 fluxgate compass transducer (cable length 8 metre / 26')
E22052	ST40 speed transom mount system supplied with E26005 transducer (cable length 9 metre / 30')
E22053	ST40 depth transom mount system supplied with E26007 transducer (cable length 9 metre / 30')
E22054	ST40 bidata transom mount system supplied with E26006 transducer (cable length 9 metre / 30')

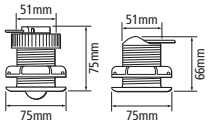
ST40 INSTRUMENT DISPLAYS

E22037	ST40 speed display
E22038	ST40 depth display
E22041	ST40 wind display
E22042	ST40 compass display
E22039	ST40 bidata display

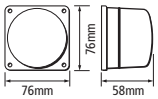
GOTO Pages 48 – 49 for product information

Bidata Instrument

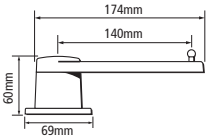
GENERAL	BIDATA
Power:	
Nominal voltage (volts DC)	12V systems
Absolute voltage range (volts DC)	10 - 16 volts
Power consumption (typical) mA	35mA
Physical:	
Overall dimensions (WxHxD) mm	126x70x38
Mounting methods	surface or bracket
Control type(s)	3 backlit buttons
Display size and type	88mm segmented LCD
Maximum character size	28mm
Display lighting	3 levels plus off
Connections:	
NMEA input and output (0183)	option via E85001
SeaTalk	✓
PC (RS232) and Raytech interface option	✓
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	0°C to +70°C
Non-operating temperature range	-10°C to +70°C
Humidity	up to 95%
Waterproofing standard	CFR46
DISPLAY PAGES	
Speed data	current/max/average
Speed range (knots)	0 to 99.9kts
Log range (nm)	0 to 99999nm
Trip range (nm)	0 to 999nm
Speed units	knots/kph/mph
Water temperature	-10°C to +40°C
Depth data	current/min
Depth range (m)	0.8 to 130m (400')
Depth offsets	keel/waterline/transducer
Depth alarms	shallow/deep/anchor
Depth units	metre/fathom/feet
Alignment and calibration	manual/via SOG
Man Over Board (MOB) repeater	✗
DISPLAY OPTIONS	
Low power indication	✓
Adjustable display response time	✓
System option supplied with transducer	✓
Replace boat speedo	✗



ST40 LOW PROFILE SPEED AND DEPTH TRANSDUCERS
(SUPPLIED WITH 9 METRE / 30' CABLE)



FLUXGATE COMPASS TRANSDUCER
(SUPPLIED WITH 8 METRE / 26' CABLE)



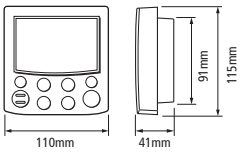
RUDDER REFERENCE
(SUPPLIED WITH 10 METRE / 33' CABLE)

Transducer Options

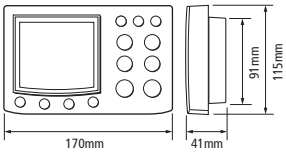
				For use on		
Part No.	**Transducer Description**	**Cable Length**	**Material**	**ST40**	**ST60+**	**ST290**
M78717	200 kHz thru hull, retractable DEPTH only	13.7m / 45ft	bronze	✓	✓	✓
M78714	200 kHz thru hull, low profile DEPTH only	13.7m / 45ft	bronze	✓	✓	✓
E26019	200 kHz thru hull, long stem DEPTH (with fairing)	13.7m / 45ft	bronze	✓	✓	✓
E26017	high speed fairing for E26019	not applicable	not applicable			
E26030	200 kHz retractable thru hull DEPTH	13.7m / 45ft	plastic	✓	✓	✓
E26001	200 kHz adjustable, in hull DEPTH only	14.5m / 47ft	plastic	✓	✓	✓
E25026	200 kHz thru hull, low profile DEPTH only	20m / 65ft	plastic		✓	✓
M78713-PZ	200 kHz thru hull, low profile DEPTH only	14m / 45ft	plastic		✓	✓
E26007	200 kHz transom mount DEPTH only	9m / 29ft	plastic	✓	✓	✓
E26027	transom mount DEPTH	9m / 29ft	plastic	✓	✓	✓
E26009	200 kHz thru hull, low profile DEPTH only	9m / 29ft	plastic	✓		
E26011-PZ	200 kHz thru hull TRIDUCER (depth/speed/temperature)	13.7m / 45ft	bronze	✓	✓	✓
E26020	200 kHz thru hull, long stem TRIDUCER (depth/speed/temperature)	13.7m / 45ft	bronze	✓	✓	✓
E26006	transom mount TRIDUCER (depth/speed/temperature)	9m / 29ft	plastic	✓	✓	✓
E26028	200 kHz transom mount TRIDUCER (depth/speed/temperature)	13.7m / 45ft	plastic	✓	✓	✓
M78716	thru hull, low profile SPEED and TEMP	13.7m / 45ft	bronze	✓	✓	✓
E26005	transom mount SPEED and TEMP	9m / 29ft	plastic	✓	✓	✓
E26031	200 kHz thru hull, low profile SPEED and TEMP	13.7m / 45ft	plastic	✓	✓	✓
E25025	thru hull, retractable SPEED and TEMP	20m / 65ft	plastic		✓	✓
E26008	200 kHz thru hull, low profile SPEED and TEMP	9m / 29ft	plastic	✓		
Z195	rotovecta WIND	20m / 65ft	plastic		✓	
E26026	ST50 to ST60 transducer junction box	not applicable	not applicable		✓	
E26024	Ultrasonic speed transducer	13.7m / 45ft		✓	✓	✓
E22078	Forward standard wind transducer	30m		✓	✓	✓
E22079	Forward looking wind transducer	50m		✓	✓	✓
E22068	Active wind transducer	50m				✓

Autopilot Control Heads

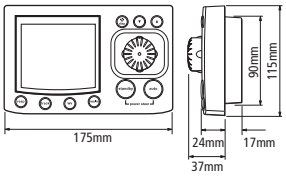
GENERAL	ST6002 PILOT CONTROL HEAD	ST7002 PILOT CONTROL HEAD	ST8002 ROTARY PILOT CONTROL HEAD
Power:			
Nominal voltage (volts DC)	12V systems	12V systems	12V systems
Absolute voltage range (volts DC)	10 - 16 volts	10 - 16 volts	10 - 16 volts
Current consumption (full backlights) mA	200mA	120mA	120mA
Current consumption (standby) mA	60mA	50mA	50mA
Physical:			
Overall dimensions (WxHxD) mm	110x115x30	170x115x41	170x115x41
Product weight kg (lbs)	0.36 (0.8)	0.45 (1.0)	0.45 (1.0)
Mounting methods	surface/flush	surface/flush	surface/flush
Control type(s)	8 backlit buttons	13 backlit buttons	9 backlit buttons & 1 rotary
Display size and type	86mm segmented LCD	98mm segmented LCD	98mm segmented LCD
Maximum character size	18mm	30mm	30mm
Display lighting	3 levels plus off	3 levels plus off	3 levels plus off
Connections:			
NMEA input (0183)	✓	✓	✓
NMEA output (0183)	via all course computers	via all course computers	via all course computers
SeaTalk	2	2	2
Approvals:			
EMC (Europe and FCC)	✓	✓	✓
CE marked	✓	✓	✓
Environmental:			
Operating temperature range	0°C to +70°C	0°C to +70°C	0°C to +70°C
Non-operating temperature range	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%	up to 95%
Waterproofing standard	IPX6 & CFR46	IPX6 & CFR46	IPX6 & CFR46
KEY FEATURES			
Steer to compass	✓	✓	✓
Steer to wind	✓	✓	✓
Steer to navigation info (waypoint or route)	✓	✓	✓
Power steer	✗	✗	✓
Waypoint advance feature	✓	✓	✓
Autotack	✓	✓	✗
Selectable tack angle	✓	✓	✓
Autotrim, Seastate	✓	✓	✓
Windtrim	✓	✓	✓
Autoadapt (for northerly/southerly environments)	✓	✓	✓
User calibration	manual	manual	manual
Compass deviation correction	auto	auto	auto
Gain	9 levels	9 levels	9 levels
Damping	9 levels	9 levels	9 levels
Response	3 levels (9 levels with Gyro)	3 levels (9 levels with Gyro)	3 levels (9 levels with Gyro)
Adjustable turn rate (not sail boat)	0° to 30°/second	0° to 30°/second	0° to 30°/second
Alarms	off course/wind/XTE/depth/watch	off course/wind/XTE/depth/watch	off course/wind/XTE/depth/watch
Diagnostic alarms	SeaTalk/drivestop/no data/volts	SeaTalk/drivestop/no data/volts	SeaTalk/drivestop/no data/volts
Rudder angle indication	✓	✓	✓
Direction to steer arrows	✓	✓	✓
ADDITIONAL FEATURES			
Predefined data displays	3 pages	3 pages	3 pages
Customisable data displays	15 pages	15 pages	15 pages
Repeat instrument and navigation data on pilot	✓	✓	✓
Man Over Board (MOB) repeater	✓	✓	✓
Advanced Steering Technology (AST)	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G
AutoLearn	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G
Fast heading output for MARPA and overlay	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G	with SmartPilot-S1G/S2G/S3G
PROCESSOR (COURSE COMPUTER) OPTIONS			
Standard autopilot	SmartPilot/S1/S2/S3	SmartPilot/S1/S2/S3	SmartPilot/S1/S2/S3
Autopilot with rate gyro	SmartPilot-S1G/S2G/S3G	SmartPilot-S1G/S2G/S3G	SmartPilot-S1G/S2G/S3G
DRIVE OPTIONS			
Standard drive	any Raymarine drive option	any Raymarine drive option	any Raymarine drive option
SYSTEM OPTIONS			
Remote control option	✓	✓	✓
Multiple control displays	✓	✓	✓
Extra loud external alarm	✓	✓	✓
Autopilot status repeated on instruments	✓	✓	✓



ST6002 CONTROL UNIT



ST7002 CONTROL UNIT

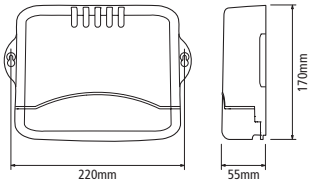


ST8002 CONTROL UNIT

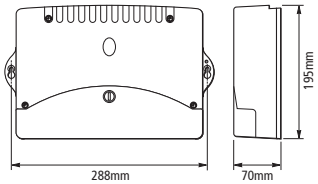
Smartpilot Course Computers

GENERAL	SMARTPILOT S1/SMARTPILOT S1G COURSE COMPUTERS	SMARTPILOT S2/SMARTPILOT S2G COURSE COMPUTERS	SMARTPILOT S3/SMARTPILOT S3G COURSE COMPUTERS
Power:			
Nominal voltage (volts DC)	12V systems	12V systems	12V, 24V systems
Absolute voltage range (volts DC)	10 - 16 volts	10 - 16 volts	10 - 32 volts
Physical:			
Overall dimensions (WxHxD) mm	238x170x55	307x195x70	307x195x70
Product weight kg (lbs)	0.55 (1.2)	2.1 (4.6)	2.1 (4.6)
Mounting methods	bulkhead	bulkhead	bulkhead
Connections:			
NMEA input (0183)	1	2	2
NMEA output (0183)	1	2	2
SeaTalk	2	2	2
Approvals:			
EMC (Europe and FCC)	✓	✓	✓
CE marked	✓	✓	✓
Environmental:			
Operating temperature range	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C
Non-operating temperature range	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Humidity	up to 80%	up to 80%	up to 80%
Waterproofing standard	drip resistant	drip resistant	drip resistant
KEY FEATURES			
Steer to compass	✓	✓	✓
Steer to wind	✓	✓	✓
Steer to navigation info (waypoint or route)	✓	✓	✓
Waypoint advance feature	✓	✓	✓
Autotack	✓	✓	✓
Selectable tack angle	✓	✓	✓
Autotrim, Seastate	✓	✓	✓
Windtrim	✓	✓	✓
Autoadapt (for northerly/southerly environments)	✓	✓	✓
User calibration	manual and Autolearn with SmartPilot S1G	manual and Autolearn with SmartPilot S2G	manual and Autolearn with SmartPilot S3G
Compass deviation correction	auto	auto	auto
Rudder gain	9 levels	9 levels	9 levels
Rudder damping	9 levels	9 levels	9 levels
Rudder response	3 levels (9 levels with Gyro)	3 levels (9 levels with Gyro)	3 levels (9 levels with Gyro)
Adjustable turn rate (not sail boat)	1° to 30°/second	1° to 30°/second	1° to 30°/second
Alarms	via control head	via control head	via control head
Diagnostic alarms	via control head	via control head	via control head
Direction to steer arrows	via control head	via control head	via control head
ADDITIONAL FEATURES			
Advanced Steering Technology (AST)	SmartPilot S1G	SmartPilot S2G	SmartPilot S3G
AutoLearn	SmartPilot S1G	SmartPilot S2G	SmartPilot S3G
Fast heading output for MARPA and overlay	(SmartPilot S1G) 5Hz	(SmartPilot S2G) 10Hz	(SmartPilot S3G) 10Hz
PROCESSOR (COURSE COMPUTER) OPTIONS			
Standard autopilot	SmartPilot S1	SmartPilot S2	SmartPilot S3
Autopilot with rate gyro	SmartPilot S1G	standard on SmartPilot S2G, option on SmartPilot S2	standard on SmartPilot S3G, option on SmartPilot S3
DRIVE OPTIONS			
Standard drive	*all type 1 12V drives and pumps	*all type 1 12V drives and pumps	*all type 1 and 2 12V/24V drives and pumps
SYSTEM OPTIONS			
Remote control option	✓	✓	✓
Multiple control displays	✓	✓	✓
Extra loud external alarm - via E85001	✓	✓	✓
External compass	standard in corepack	standard in corepack	standard in corepack
Rudder reference	standard in corepack	standard in corepack	standard in corepack

** Drive unit selection dictated by boat steering system.*



SMARTPILOT S1 COURSE COMPUTER

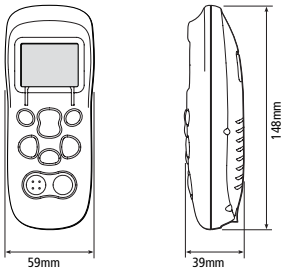


SMARTPILOT S2 & S3 COURSE COMPUTER

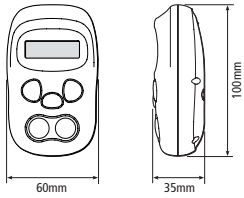
GOTO Pages 58 – 59 for product information

Wireless Autopilot Remotes

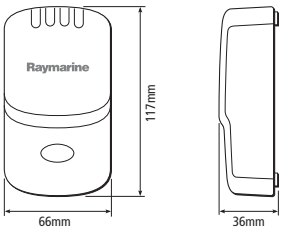
GENERAL	S100 WIRELESS AUTOPILOT REMOTE	SMARTCONTROLLER
Power:		
Nominal voltage (volts DC)	12V systems	12V systems
Absolute voltage range	10 – 16 volts	10 – 16 volts
Battery	2 x AAA	rechargeable NiMH
Physical:		
Overall dimensions (HxWxD) mm	100x60x35	148x59x40
Product weight kg (lbs)	0.06 (0.13)	0.16 (0.35)
Mounting methods	cradle, lanyard and belt clip	cradle, lanyard and belt clip
Control type	5 buttons	8 buttons
Display size and type	9 x 35mm dot matrix LCD	25 x 35mm dot matrix LCD
Maximum character size	8 mm	16 mm
Display lighting	on/off	on/off
SeaTalk	via RF	via RF/wired
RF transmitter & receiver	✓	✓
Approvals:		
EMC, FCC and IC	✓	✓
CE marked	✓	✓
Environmental:		
Operating temperature range	-10°C to +50°C	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%
Waterproofing standard	IPX6	IPX6
KEY FEATURES		
Steer to GPS	✓	✓
Steer to navigation info	waypoint or route	waypoint or route
Rudder gain	✓	✓
Rudder damping	✓	✓
Response	✓	✓
Repeats other SeaTalk data	✓	✓



SMARTCONTROLLER



S100 WIRELESS AUTOPILOT REMOTE



BASE STATION

GENERAL	BASE STATION
Power:	
Nominal voltage (volts DC)	12V systems
Absolute voltage range	10 – 16 volts
Physical:	
Overall dimensions (HxWxD) mm	117x66x36
Product weight kg (lbs)	0.1 (0.22)
Mounting methods	surface
NMEA input (0183)	via E85001
NMEA output (0183)	via E85001
SeaTalk connection	1
RF transmitter & receiver	✓
Approvals:	
EMC, FCC and IC	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 80%
Waterproofing standard	drip resistant
KEY FEATURES	
User calibration	pre-registered

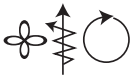
WIRELESS AUTOPILOT REMOTES

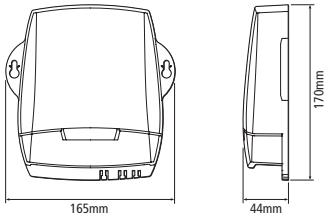
E15024	S100 wireless autopilot remote with base station
E15023	SmartController wireless autopilot remote and instrument repeater with base station
A18106	Base station

GOTO Pages 62 – 63
for product information

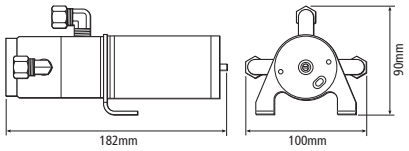
S1000 Inboard Autopilot with Wireless Remote

for Hydraulic Systems

GENERAL	S1000 COURSE COMPUTER
Power:	
Nominal voltage (volts DC)	12V systems
Absolute voltage range (volts DC)	10 – 16 volts
Physical:	
Overall dimensions (LxWxD) mm	165x170x44
Course computer weight kg (lbs)	0.4 (0.88)
Mounting methods	surface
NMEA input connections (0183)	1
NMEA output connections (0183)	1
SeaTalk connections	1
RF transmitter & receiver	✓
Approvals:	
EMC, FCC and IC	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to +80%
Waterproofing standard	water resistant
KEY FEATURES	
Steer to GPS	✓
Steer to navigation info	waypoint or route
User calibration	auto
Rudder gain	9 levels via control head
Rudder damping	9 levels via control head
Rudder response	9 levels via control head
Data alarms	via control head
Autopilot alarms	via control head
Direction to steer arrows	via control head
ADDITIONAL FEATURES	
SmartSteer	✓
Fishing patterns	inc. cloverleaf, zigzag, circle 
Autolearn	✓
Processor options	
Autopilot	S1000
Drive options	
Standard drive	S1000 pump
System options	
Remote	✓
Multiple control displays	✓
Extra loud external alarm	✓
Pilot status repeats on instruments	✓
S1000 Fit Guide (Typical)	
Vessel type and size	sport fishing up to 25'
Steering type	balanced hydraulic
Steering ram capacity	80-200cc
Peak flow rate	800cc/min



S1000 COURSE COMPUTER



S1000 PUMP

AUTOPILOT WITH WIRELESS REMOTE

E12169	SmartPilot S1000 wireless autopilot system

GOTO Page 64
for product information

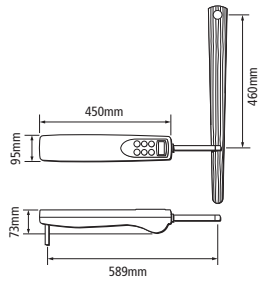
Tiller and Wheel Pilots

GENERAL	S1 TILLER PILOT	S1 WHEEL PILOT
Power:		
Nominal voltage (volts DC)	12V systems	12V systems
Absolute voltage range (volts DC)	10 – 16 volts	10 – 16 volts
Current consumption (standby) mA	60mA	60mA (drive: 0.7W)
Physical:		
Overall dimensions (WxHxD) mm	control head 110x115x41	control head 110x115x41
Product weight kg (lbs)	drive 1.34 (2.9)	1.5 (3.3)
Mounting methods	control head flush/surface/bracket	control head flush/surface/bracket
Control type(s)	8 backlit buttons	8 backlit buttons
Display size and type	86mm segmented LCD	86mm segmented LCD
Maximum character size	18mm	18mm
Display lighting	3 levels plus off	3 levels plus off
Connections:		
NMEA input (0183) and output	✓	✓
SeaTalk	2	2
Approvals:		
EMC (Europe and FCC)	✓	✓
CE marked	✓	✓
Environmental:		
Operating temperature range	-10°C to +70°C	-10°C to +70°C
Non-operating temperature range	-10°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%
Waterproofing standard	CFR46	CFR46
KEY FEATURES		
Steer to compass	✓	✓
Steer to wind	✓	✓
Steer to navigation info (waypoint or route)	✓	✓
Waypoint advance feature	✓	✓
Autotack	✓	✓
Selectable tack angle	40° to 125°	40° to 125°
Autotrim, Seastate	✓	✓
Windtrim	✓	✓
Autoadapt (for northerly/southerly environments)	✓	✓
User calibration	manual	manual
Compass deviation correction	auto/manual	auto/manual
Gain	9 levels	9 levels
Damping	9 levels	9 levels
Response	9 levels	with gyro option
Autolearn	✓	5° to 20°/second
Alarms	off course/wind/XTE/depth/watch	off course/wind/XTE/depth/watch
Diagnostic alarms	SeaTalk/drivestop/no data/volts	SeaTalk/drivestop/no data/volts
Rudder angle indication	✗	✓
Direction to steer arrows	✓	✓
ADDITIONAL FEATURES		
Predefined data displays	3 pages	3 pages
Customisable data displays	15 pages	15 pages
Repeat instrument and navigation data on pilot	✓	✓
Man Over Board (MOB) repeater	✓	✓
DRIVE OPTIONS		
Standard drive	S1 Plus Tiller	S1 Wheel
Optional drives	S1 GP Tiller	✗
Thrust kg (lbs)/torque Nm (lb.in.)	S1 Plus: 84kg (185lbs) S1 GP: 84kg (185lbs)	30 Nm ✗
Stroke/revs per minute/peak flow rate	254mm (10")	9 rpm
Max. recommended laden boat displacement	S1 Plus: 6000kg (13000lbs) S1 GP: 7500kg (16500lbs)	7500kg (16,500lbs)
SYSTEM OPTIONS		
Remote control option	✓	✓
Multiple control displays	✓	✓
Extra loud external alarm – via E85001	✓	✓
Autopilot status repeated on instruments	✓	✓
External compass	standard part	standard part
Rate gyro stabilised compass	standard	optional
Rudder reference option	✗	✓

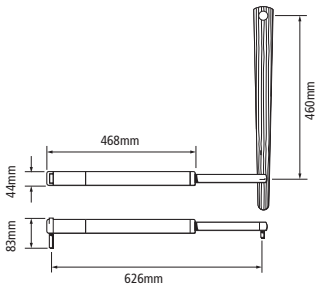
GOTO Pages 52 – 53
for product information

Tiller Pilots

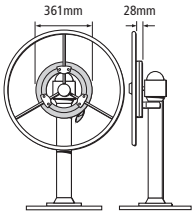
GENERAL	ST1000/ST2000 TILLER PILOTS
Power:	
Nominal voltage (volts DC)	12V systems
Absolute voltage range (volts DC)	10 - 16 volts
Current consumption (standby) mA	40mA
Physical:	
Overall dimensions (WxHxD) mm	450x73x95
Product weight kg (lbs)	1.53 (3.4)
Mounting methods	reversible port or starboard
Control type(s)	6 buttons
Display size and type	45mm segmented LCD
Maximum character size	9mm
Display lighting	3 levels plus off
Connections:	
NMEA input (0183)	✓
SeaTalk	✓
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +70°C
Non-operating temperature range	-10°C to +70°C
Humidity	up to 95%
Waterproofing standard	CFR46
KEY FEATURES	
Steer to compass	✓
Steer to wind	✓
Steer to navigation info (waypoint or route)	✓
Waypoint advance feature	✓
Autotack	✓
Selectable tack angle	✗
Autotrim, Seastate	✓
Windtrim	✓
Autoadapt (for northerly/southerly environments)	✓
User calibration	manual
Compass deviation correction	auto/manual
Gain	9 levels
Damping	9 levels
Response	2 levels
Adjustable turn rate	✗
Alarms	off course
Diagnostic alarms	✗
Rudder angle indication	✗
Direction to steer arrows	✗
ADDITIONAL FEATURES	
Predefined data displays	3 pages
Customisable data displays	✗
Repeat instrument and navigation data on pilot	
Man Over Board (MOB) repeater	✗
DRIVE OPTIONS	
Standard drive	integral (drive/display/compass)
Optional drives	✗
Thrust kg (lbs)/torque Nm (lb.in.)	ST1000: 57kg (125lbs) ST2000: 77kg (169lbs)
Stroke/revs per minute/peak flow rate	254mm (10")
Max. recommended laden boat displacement	ST1000: 3000kg (6600lbs) ST2000: 4500kg (10000lbs)
SYSTEM OPTIONS	
Remote control option	✓
Multiple control displays	✓
Extra loud external alarm - via E85001	✓
Autopilot status repeated on instruments	✓
External compass	optional
Rate gyro stabilised compass	optional
Rudder reference option	✗



ST1000 AND ST2000 TILLERPILOT



S1 PLUS AND S1 GP TILLERPILOT



S1 WHEELPILOT

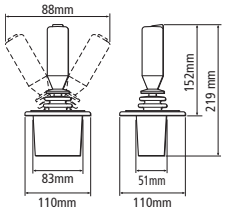
TILLERPILOTS	
A12004	ST1000 tillerpilot
A12005	ST2000 tillerpilot
E12190	S1 Plus tiller pilot
E12192	S1 GP tiller pilot

WHEELPILOTS	
E12180	ST6002 S1 wheel drive system
E12093	S1 MkII wheel drive only

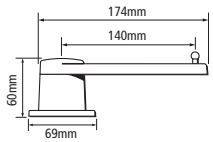
CONTROL UNIT ONLY	
E12098-P	ST6002 control head, surface mount
E12100-P	ST6002 control head, flush mount

GOTO Page 51
for product information

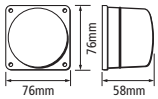
Smartpilot Systems



SEATALK JOYSTICK CONTROL



RUDDER REFERENCE
(SUPPLIED WITH 10 METRE / 33' CABLE)



FLUXGATE COMPASS TRANSDUCER
(SUPPLIED WITH 8 METRE / 26' CABLE)

SMARTPILOT SYSTEMS

Complete modular inboard autpilot systems consist of a control head, corepack and drive unit

E12106	S1 hydraulic type 1 inboard (rotary rudder feedback unit) with ST6002 control head
E12120	S1G hydraulic type 1 inboard (rotary rudder feedback unit) with ST6002 control head
E12107	S1 hydraulic type 1 outboard (linear rudder feedback unit) with ST6002 control head
E12122	S1G hydraulic type 1 outboard (linear rudder feedback unit) with ST6002 control head
E12108	S1 linear drive wth ST6002 control head
E12124	S1G linear drive with ST6002 control head
E12116	S1 hydraulic type 1 inboard (rotary rudder feedback unit) with ST8002 control head
E12121	S1G hydraulic type 1 inboard (rotary rudder feedback unit) with ST8002 control head
E12117	S1 hydraulic type 1 outboard (linear rudder feedback unit) withST8002 control head
E12123	S1G hydraulic type 1 outboard (linear rudder feedback unit) with ST8002 control head
E12118	S1 linear drive wth ST8002 control head
E12125	S1G linear drive with ST8002 control head

CONTROL HEADS

E12098-P	ST6002 control head, surface mount
E12100-P	ST6002 control head, flush mount
E12099-P	ST7002 control head, surface mount
E12182	ST7002 control head, flush mount
E12119-P	ST8002 rotary control head, surface mount
E12183	ST8002 rotary control head, flush mount

SUNCOVERS

A25004	ST6002 suncover
A15001	ST7002 suncover
A18097	ST8002 suncover

JOYSTICK CONTROL

E12136	SeaTalk joystick control
A18096	SeaTalk joystick interface box only

SMART HEADING SENSOR, RATE GYRO COMPASS

E12101	Rate gyro processor unit
E12102	Pathfinder smart heading rate gyro system includes fluxgate compass

COMPASS TRANSDUCER

M81190	Fluxgate compass wih spade contacts supplied with 8 metre / 26' cable

RUDDER REFERENCE TRANSDUCER

M81105	Rudder reference, supplied with 10 metre / 33' cable

CORE PACKS*

E12114	SmartPilot S1 12V corepack
E12115	SmartPilot S1G 12V high performance corepack with built in gyro
E12054	SmartPilot S2 12V corepack
E12091	SmartPilot S2G 12V high performance corepack with built in gyro
E12055	SmartPilot S3 12/24V corepack
E12092	SmartPilot S3G 12/24V high performance corepack with built-in gyro

* ***Corepacks include:*** *course computer, rudder reference transducer, and fluxgate compass. High performance corepacks include: course computer with built-in rate gyro and AST technology, standard fluxgate compass, and rotary rudder reference transducer.*

Selecting the Right Autopilot **Drive** Unit

Drive Units

Identify the correct drive unit type* for your boat (refer to the table on pages 55 – 57), then use the following information to identify the correct model.

** We recommend that a Raymarine approved dealer confirms your selection and carries out the installation and commissioning. Approved installations carry a FULL 2 YEAR WORLDWIDE WARRANTY. For more information contact your national distributor (see outside back cover for details) or consult **www.raymarine.com***

Type 1 and 2 **Rotary Drive**

BOAT LADEN DISPLACEMENT (MAXIMUM):
Type 1: 10,000kg (22,000lb)
Type 2: 20,000kg (44,000lb)

PEAK OUTPUT TORQUE:
Type 1: 20Nm (180lb.in)
Type 2: 34Nm (300lb.in)

MAXIMUM SHAFT SPEED:
33rpm

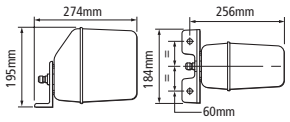
SPROCKETS:

M81182	13T sprocket
M81183	15T sprocket
M81184	17T sprocket
M81185	19T sprocket
M81186	25T sprocket

DRIVE UNIT PART NUMBERS:

M81135	Type 1 (12V)
M81136	Type 2 (12V)
M81137	Type 2 (24V)

Type 1 Drive - SmartPilot S1/S2/S3 Course Computer
Type 2/3 Drive - SmartPilot S3 Course Computer only
All 24V Drives - use SmartPilot S3 Course Computer



TYPE 1 AND 2 ROTARY DRIVE

Standard and Universal **Sterndrive**

Universal Sterndrive shown.

DRIVE:
Electromechanical for power-assisted sterndrive systems.
Not all sterndrive systems are supported.

MAXIMUM THRUST:
150kg (330lb) Standard sterndrive
80kg (175lb) Universal sterndrive

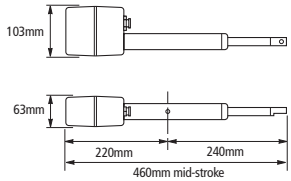
HARDOVER TIME:
8.8secs

STROKE:
214mm (8.3in)

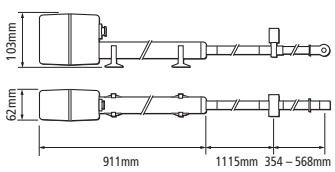
DRIVE UNIT PART NUMBERS:

M81138	Standard sterndrive
E12026	Universal sterndrive

Type 1 Drive - SmartPilot S1/S2/S3 Course Computer
Type 2/3 Drive - SmartPilot S3 Course Computer only
All 24V Drives - use SmartPilot S3 Course Computer



STANDARD STERNDRIVE



UNIVERSAL STERNDRIVE

Type 1 and 2 **Linear Drive**

BOAT LADEN DISPLACEMENT (MAXIMUM):
Type 1: 10,000kg (22,000lb) Type 2S: 15,000kg (33,000lb),
Type 2L: 20,000kg (44,000lb)

PEAK THRUST:
Type 1: 295kg (650lb), Type 2S/Type 2L: 480kg (1050lb)

STROKE:
Type 1/Type 2S: 300mm (12in), Type 2L: 400mm (16in)

HARDOVER TIME (NO LOAD):
Type 1/Type 2S: 11secs, Type 2L: 14secs

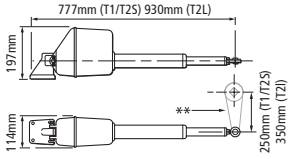
RUDDER TORQUE (MAXIMUM):
Type 1: 735Nm (6500lb.in), Type 2S: 1190Nm (10,500lb.in),
Type 2L: 1660Nm (14,700lb.in)

DRIVE UNIT PART NUMBERS:

M81130	Type 1 (12V)
M81131	Type 2S (Short) (12V)
M81132	Type 2L (Long) (12V)
M81133	Type 2S (Short) (24V)
M81134	Type 2L (Long) (24V)

Type 1 Drive - SmartPilot S1/S2/S3 Course Computer
Type 2/3 Drive - SmartPilot S3 Course Computer only
All 24V Drives - use SmartPilot S3 Course Computer

** Includes G version SmartPilot.*



TYPE 1 AND 2 LINEAR DRIVE
** NOT SUPPLIED (CONTACT STEERING MANUFACTURER)

Selecting the Right Autopilot **Drive** Unit

S1 Course Computer

Rotary Rudder Refererence

Fluxgate Compass

Corepack selection
Type 1 (12V) drives require S1/S2 or S1G/S2G corepacks.
Type 1 (24V), Type 2 and Type 3 drives require S3 or S3G corepacks.

Type 1, 2 and 3 **Hydraulic Pumps**

BOAT STEERING RAM CAPACITY:
Type 1: 4.9in³ – 14in³ (80cc – 230cc)
Type 2: 14in³ – 21in³ (230cc – 350cc)
Type 3: 21in³ – 30.5in³ (350cc – 500cc)

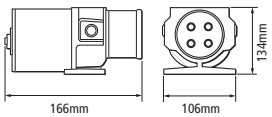
MAXIMUM STALL PRESSURE AT 12V:
Type 1: 750psi (50bar)
Type 2: 1450psi (100bar)
Type 3: 1160psi (80bar)

PEAK FLOW RATE (NO LOAD):
Type 1: 67in³/min (1000cc/min)
Type 2: 122in³/min (2000cc/min)
Type 3: 175in³/min (2900cc/min)

DRIVE UNIT PART NUMBERS:

M81120	Type 1 (12V)
M81119	Type 1 (24V)
M81121	Type 2 (12V)
M81123	Type 2 (24V)
M81122	Type 3 (12V)
M81124	Type 3 (24V)

Type 1 Drive - SmartPilot S1/S2/S3 Course Computer
Type 2/3 Drive - SmartPilot S3 Course Computer only
All 24V Drives - use SmartPilot S3 Course Computer



TYPE 1, 2 AND 3 HYDRAULIC (TYPICAL SIZE SHOWN)

Type 2 and 3 **Hydraulic Linear Drive**

BOAT LADEN DISPLACEMENT (MAXIMUM):
Type 2: 22,000kg (48,500lb), Type 3: 35,000kg (77,000lb)

PEAK THRUST:
Type 2: 585kg (1290lb, Type 3: 1000kg (2200lb)

MAXIMUM STROKE:
Type 2: 254mm (10in), Type 3: 300mm (12in)

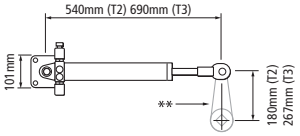
HARDOVER (NO LOAD):
Type 2: 10secs, Type 3: 12secs

MAXIMUM RUDDER TORQUE:
Type 2: 1270Nm (11,300lb.in)
Type 3: 2565Nm (23,100lb.in)

DRIVE UNIT PART NUMBERS:

M81200	Type 2 (12V)
M81201	Type 2 (24V)
M81202	Type 3 (12V)
M81203	Type 3 (24V)

Suitable for SmartPilot S3 Corepacks only.



TYPE 2 AND 3 HYDRAULIC LINEAR
** NOT SUPPLIED (CONTACT STEERING MANUFACTURER)

Constant Running **Pumps**

Contact product support for information

Smartpilot for Verado Outboard Engines

GENERAL	
Power:	
Nominal voltage (volts DC)	12V systems
Absolute voltage range (volts DC)	10 - 16 volts
Physical:	
Overall dimensions (WxHxD) mm	238x170x55
Product weight kg (lbs)	0.55 (1.2)
Mounting methods	bulkhead
Connections:	
NMEA input (0183)	1
NMEA output (0183)	1
SeaTalk	2
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +55°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 80%
Waterproofing standard	drip resistant
KEY FEATURES	
Steer to compass	✓
Steer to navigation info (waypoint or route)	✓
Waypoint advance feature	✓
Autotack	✓
Selectable tack angle	✓
Autotrim, Seastate	✓
Autoadapt (for northerly/southerly environments)	✓
User calibration	manual and Autolearn with ST6002
Compass deviation correction	auto
Rudder gain	9 levels
Rudder damping	9 levels
Rudder response	9 levels
Adjustable turn rate (not sail boat)	1° to 30°/second
Alarms	via control head
Diagnostic alarms	via control head
Direction to steer arrows	via control head
ADDITIONAL FEATURES	
Advanced Steering Technology (AST)	SmartPilot S1G
AutoLearn	SmartPilot S1G
Fast heading output for MARPA and overlay	(SmartPilot S1G) 5Hz
PROCESSOR (COURSE COMPUTER) OPTIONS	
Standard autopilot	SmartPilot S1G
DRIVE OPTIONS	
Standard drive	type 1 12V pump
SYSTEM OPTIONS	
Remote control option	✓
Multiple control displays	✓
Extra loud external alarm - via E85001	✓
External compass	standard in corepack

SMARTPILOT FOR VERADO PART NUMBERS

E12184	Smartpilot for Verado Autopilot System

Smartpilot IPS for Volvo Penta IPS Drive Systems

GENERAL	
Power:	
Nominal voltage (volts DC)	12V, 24V systems
Absolute voltage range (volts DC)	10 - 32 volts
Physical:	
Overall dimensions (WxHxD) mm	307x195x70
Product weight kg (lbs)	2.1 (4.6)
Mounting methods	bulkhead
Connections:	
NMEA input (0183)	1
NMEA output (0183)	1
SeaTalk	2
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +55°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 80%
Waterproofing standard	drip resistant
KEY FEATURES	
Steer to compass	✓
Steer to navigation info (waypoint or route)	✓
Waypoint advance feature	✓
Autotack	✓
Selectable tack angle	✓
Autotrim, Seastate	✓
Autoadapt (for northerly/southerly environments)	✓
User calibration	manual and Autolearn with ST6002/ ST7002/ST8002
Compass deviation correction	auto
Rudder gain	9 levels
Rudder damping	9 levels
Rudder response	9 levels
Adjustable turn rate (not sail boat)	1° to 30°/second
Alarms	via control head
Diagnostic alarms	via control head
Direction to steer arrows	via control head
ADDITIONAL FEATURES	
Advanced Steering Technology (AST)	SmartPilot S3G
AutoLearn	SmartPilot S3G
Fast heading output for MARPA and overlay	(SmartPilot S3G) 10Hz
PROCESSOR (COURSE COMPUTER) OPTIONS	
Standard autopilot	SmartPilot S3G IPS
DRIVE OPTIONS	
Standard drive	data output to IPS via DPU
SYSTEM OPTIONS	
Remote control option	✓
Multiple control displays	✓
Extra loud external alarm - via E85001	✓
External compass	standard in corepack

SMARTPILOT IPS FOR VOLVO PENTA IPS SYSTEMS

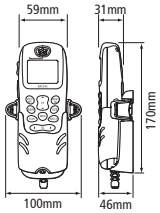
E12177	S3G Volvo IPS Course Computer
E12178	ST290 Volvo IPS DPU

Note: *Volvo Penta IPS pilot interface required.*

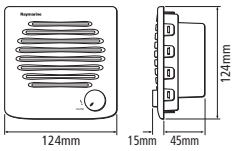
GOTO Page 65 for product information

Ray240E Class D-DSC VHF Radio

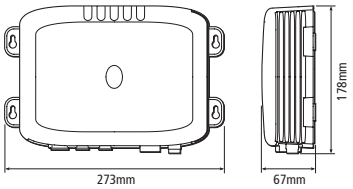
GENERAL	
Power:	
Nominal voltage (volts DC)	12V systems
Absolute voltage range (volts DC)	10.8 - 15.6 volts
Power consumption (typical) amps	standby 220mA/RX 600mA/TX@1.5W = 1.5A/TX@25W = 5.5A
Physical:	
Primary handset	**full function handset - E45010**
Overall dimensions (WxHxD) mm	59x170x31
Product weight kg (lbs)	0.38 (0.84)
Mounting methods	cradle/hand held
Control type(s)	11 dedicated keys, plus full alpha numeric keypad
Distress button	under sliding cover
Display size and type	45mm LCD
Display lighting	3 levels and off
Base Transceiver unit:	**remote base station - R49131**
Overall dimensions (WxHxD) mm	273x178x67
Product weight kg (lbs)	1.4 (3.12)
Mounting methods	surface
Control type(s)	✗
Display size and type	✗
Display lighting	✗
Ancillary items (1)	**powered loudspeaker - E45003**
Overall dimensions (WxHxD) mm	124x124x60
Product weight kg (lbs)	0.42 (0.93)
Mounting methods	flush/surface
Control type(s)	rotary volume knob
Distress button	✗
Display size and type	✗
Display lighting	✗
Ancillary items (2)	**hailer horn (see Ray430)**
Connections:	
NMEA input (0183) and output	✓
SeaTalk	✓
Approvals:	
EMC (R and TTE and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-10°C to +50°C
Non-operating temperature range	-20°C to +70°C
Humidity	up to 95%
Waterproofing standard (full and basic handset)	IPX7 & JIS-7 (submersible)
Waterproofing standard (base unit and speaker)	IPX6 & CFR46 (speaker), splashproof (base unit)
KEY FEATURES	
Class D-DSC (Digital Selective Calling)	✓
Dedicated Ch70 watch receiver (DSC)	✓
ATIS	where required
Programmable private channels	up to 10 national channels (specific within certain countries)
Programmable scanning	✓
All channels scanning	✓
User programmable MMSI number	✓
User programmable ATIS number	✓
Dual watch	Ch16/working channel
Tri watch	Ch16/working/multi-channel
DSC position, time and date	via SeaTalk or NMEA
Store MMSI numbers	✓
DSC group calls	✓
Distant/local key for interference reduction	✓
Fog alert/siren mode	7 automatic plus manual
Hailer (speak and listen)	with optional horn
TRANSMITTER SPECIFICATION	
Output power (high/low) watts	25W/1W nominal
Channels (all available international)	✓
Spurious and harmonic emissions	<0.25µW
Audio distortion	<10% at 1kHz for 3kHz deviation
Transmitter protection	open/short circuit of antenna
RECEIVER SPECIFICATION	
Audio output internal speaker (watts)	handset - 1mW (<10% distortion in 8 ohms)
Audio output external speaker (watts)	5W (<10% distortion in 8 ohms)
Channels (all available international)	✓ can select frequency set for USA or Canada
Sensitivity	0.4µV at 20dB SINAD
Audio distortion	<10% at 1kHz for 3kHz deviation
SYSTEM OPTIONS	
External loud speaker	supplied as standard
Interface with GPS	via SeaTalk or NMEA
Multi-station option	up to 2 handsets
Intercom between handsets	✓



RAY240E HANDSET
(SHOWN IN CRADLE)



RAY240E SPEAKER



RAY240E BASE

RAY240E	
E42002	Ray240E fixed mount VHF
E45002	Ray240E 2nd station
E45003	Active speaker

RAY240E ACCESSORIES	
E45010	Ray240E handset only
E45011	Ray240E 3m extension cable
E45012	Ray240E 5m extension cable
E45013	Ray240E 10m extension cable
E45014	Ray240E bulkhead mounting kit

GOTO Page 67
for product information

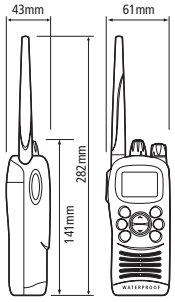
RAY101E, RAY54E VHF Radios

GENERAL	RAY101E	RAY54E
Power:		
Nominal voltage (volts DC)	7.2V	12V
Absolute voltage range/batteries	6x AA Alkaline or AA NiMH - 1300mA/H	10.5 - 16 volts
Physical:		
Overall dimensions (WxHxD) mm	141x61x43 (without antenna)	196x98x171 (with bracket)
Product weight kg (lbs)	0.36 (0.79)	1.3 (2.87)
Mounting methods	handheld/belt clip/wrist strap/charger base	bracket or flush mount
Control types	2 rotary knobs for squelch & volume 8 dedicated keys	3 rotary knobs for channel selection, squelch & volume 7 keys including a distress button
Control type (fist mike)	✗	Microphone with 4 dedicated buttons
Distress button	✗	✓
Display size and type	38mm (1.5") LCD	63mm (2.5") LCD
Backlighting	✓	keypad and display
Adjustments	✓	9 brightness and contrast adjustments
Connections:		
NMEA 0183 input	-	✓
Approvals:		
ETSI, ATIS functionality	✓	✓
EMC (R and TTE and FCC)	✓	✓
CE marked	✓	✓
Environmental:		
Operating temperature range	-10°C to +50°C	-15°C to +55°C
Storage temperature range	-20°C to +70°C	-20°C to +70°C
Humidity	up to 95%	up to 95%
Waterproofing standard	IPX7 (submersible)	IPX7 (submersible)
KEY FEATURES		
Transmit frequency range	156.025 to 157.425 MHz	156.025 to 157.425 MHz
Receive frequency range	156.050 to 163.275 MHz	156.050 to 163.275 MHz
Channels	55 international VHF marine bands 50 US and 60 Canadian channels if programmed	all international VHF marine bands 50 US and 60 Canadian channels if programmed
Modulation	FM 16K0G3E, DSC 16K0G2B	FM 16K0G3E, DSC 16K0G2B
Channel spacing	25 kHz increments	25 kHz increments
Frequency stability	+/- 10 PPM	+/- 10 PPM
Class D-DSC (Digital Selective Calling)	✗	✓
Dedicated Ch70 watch receiver (DSC)	✗	✓
ATIS (if required)	✓	✓
Programmable private channels (if licensed)	✓	✓
Programmable scanning	✓	✓
All channels scanning	✓	✓
User programmable MMSI number	✗	✓
User programmable ATIS number	✓	✓
Dual watch	✓	✓
Tri-watch	✓	✓
DSC position, time and date	✗	✓ via NMEA
Store MMSI numbers	✗	✓
DSC group calls	✗	✓
NOAA weather alert	✓	✓
Transmitter Specification		
Output power (high/low) watts	5W or 1W settings	25W or 1W settings
Spurious and harmonic emissions	<60dB	<0.25 microwatts
Current drain	high power <= 1.8A, low power <= 0.7A	high power <= 6A, low power <= 1.5A
Receiver Specification		
Audio output power at THD	5% >= 250mW	2W
Sensitivity (12dB SINAD)	0.3 microvolts	0.25 microvolts
Squelch sensitivity	✗	> 0.7 microvolts at tight
Current drain	max power 200mA, standby 40mA	max power 1.5A, standby 0.5A
Audio distortion	<5%	10%
Spurious response rejection ratio	70dB	70dB
Speaker jack output	✗	2W into 8 ohm load

GOTO Pages 68 – 69
for product information

Loudhailer with Intercom

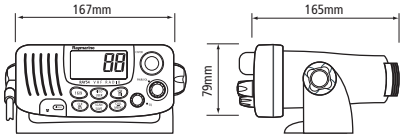
GENERAL	RAY430
Power:	
Nominal voltage (volts DC)	12V systems
Absolute voltage range (volts DC)	10.8 - 16 volts
Power consumption (typical) amps	5 amps at 30W
Physical:	
Primary handset	**fist microphone**
Overall dimensions (WxHxD) mm	63x85x38
Product weight kg (lbs)	0.13 (0.3)
Mounting methods	cradle/hand held
Control type	push to transmit button
Base transceiver unit	**full function base station**
Overall dimensions (WxHxD) mm	195x110x135
Product weight kg (lbs)	1.9 (4.3)
Mounting methods	surface or bracket
Control type(s)	10 backlit buttons and 3 rotary knobs
Display size and type	64mm segmented LCD
Display lighting	variable lighting
Ancillary items (1)	**hailer horn**
Overall dimensions (WxHxD) mm	165x280x216
Product weight kg (lbs)	1.8 (4.1)
Mounting methods	surface or bracket
Ancillary items (2)	**intercom speaker**
Overall dimensions (WxHxD) mm	112x97x55
Product weight kg (lbs)	0.34 (0.75)
Mounting methods	bracket
Control type	push button
Approvals:	
EMC (Europe and FCC)	✓
CE marked	✓
Environmental:	
Operating temperature range	-15°C to +55°C
Humidity	up to 95%
Waterproofing (base unit, fist mike and horn) standard	CFR46
KEY FEATURES	
Audio output of hailer (watts)	30W
Audio output of intercom (watts)	4.5W
Audio output of external speaker (watts)	4.5W
Output impedance	8 ohms
Fog alert/siren mode	9 types (auto/manual including air horn sound)
Hailer listen mode	✓
Hailer options	fore, aft or both options
SYSTEM OPTIONS	
Multi-station option	base unit and up to 4 remote intercom speakers
External loud speaker	base unit/remote speaker/hailer horn
Intercom option (2 way)	with remote intercom speakers
Auxiliary mode (transmission of external audio)	auxiliary input via AUX 1 and 2
Built in alarm (intrusion, bilge or other)	external alarm interface
Remote microphone	✓



RAY101E

HANDHELD VHF - RAY101E	
E43028	Ray101E handheld VHF
E43028-UK	Ray101E handheld VHF (UK)
T43029	Ray101E with power adaptor (UK)
T43030	Ray101E with power adaptor (AUS/NZ)
T43031	Ray101E with power adaptor (EU)

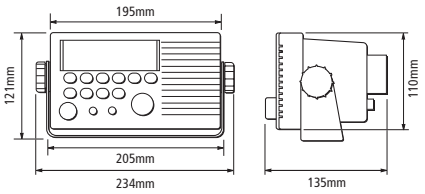
RAY101E ACCESSORIES	
E46038	Type D power adaptor (UK)
E46039	Type C power adaptor (AUS/NZ)
E46041	Type B power adaptor (EU)



RAY54E

RAY54E	
E43024	Ray54E VHF (white)
E43024-UK	Ray54E VHF (white) (UK)
E43025	Ray54E VHF (dark grey)
E43025-UK	Ray54E VHF (dark grey) (UK)

RAY54E ACCESSORIES	
E46034	Ray54E flush mount kit
R49109	Ray54E suncover (white)
R49110	Ray54E suncover (dark grey)



RAY430

LOUDHAILERS	
M95997	Ray430 loudhailer system with hailing horn
M95997A	Ray430 loudhailer (without hailing horn)
M95435	Hailing horn speaker
M95998	Intercom speaker

GOTO
Page 68
for product information

Cables and Accessories

SEATALK CABLES	
D187	SeaTalk flat to male round connector
D188	SeaTalk flat to female round connector
E25028	ST40 Interconnect kit

DSM300 CABLES	
E65010	DSM300 to C Series cable, 3m
E65011	DSM300 to C Series cable, 10m
E65009	DSM300 (hsb) to C Series cable, 3m
E05016	DSM300 (hsb) to C Series cable, 10m
R69081	DSM300 (hsb) adaptor

SEATALK² CABLES FOR ST290 PLUG TO PLUG	
E25036	SeaTalk² cable 400mm plug to plug
E25038	SeaTalk² cable 10m plug to plug
E25040	SeaTalk² cable 1m plug to plug
E25042	SeaTalk² cable 3m plug to plug
E25043	SeaTalk² cable 5m plug to plug
E25044	SeaTalk² cable 20m plug to plug

SEATALK² CABLES FOR ST290 PLUG TO BARE WIRE	
E25041	SeaTalk² 1m plug to wire
E25039	SeaTalk² 10m plug to wire
E25037	SeaTalk² 400mm plug to wire

SEATALK² CABLES ACCESSORIES	
E25045	SeaTalk² cable plug boots (pack of 5)
E25046	SeaTalk² junction box blanking plugs
E25048	SeaTalk² bus terminator

E AND C SERIES RADOME CABLES	
E55067	10m right-angled end Radome Cable (2kW Only)
E55068	15m right-angled end degree Radome Cable (2kW Only)
M92720	15m straight end Radome Cable (2kW Only)
E55074	5m right-angled end Radome Cable (2kW & 4kW)
E55065	15m right-angled end Radome Cable (2kW & 4kW)
E55066	25m right-angled end Radome Cable (2kW & 4kW)
M92668	15m straight end Radome Cable (2kW & 4kW)
M92669	25m straight end Radome Cable (2kW & 4kW)

E AND C SERIES OPEN ARRAY CABLES (SPLIT)	
E55069	2.5m 90 Degree Split Pedestal Adaptor Cable
E55075	5m 90 Degree Split Pedestal Cable
E55063	15m 90 Degree Split Pedestal Cable
E55064	25m 90 Degree Split Pedestal Cable

E AND C SERIES RADAR EXTENSION CABLES	
E55071	5m 90 Degree Extension Cable
E55072	10m 90 Degree Extension Cable

RADAR ACCESSORIES	
M92722	Mast-mount 18" radome (scanner)
M92698	Mast-mount 24" radome (scanner)

C AND E SERIES ACCESSORIES	
E55049	SeaTalk^{hs} network cable – 1.5m
E55050	SeaTalk^{hs} network cable – 5m
E55051	Ethernet cale
E55052	SeaTalk^{hs} network cable – 20m
E55053	SeaTalk²/NMEA2000 cable – 1.5m
E55054	SeaTalk/alarm out cable – 1.5m
E55055	Video out cable – 10m
E55056	Video out cable –20m
E55057	Video in cablee – 1.5m
E55058	SeaTalk^{hs} network switch
E55060	SeaTalk^{hs} crossover coupler
E55061	SeaTalk² navigation keyboard
E55062	S-Video cable 1.5m
E65011	DSM300 to C Series cable – 10m

GPS ACCESSORIES	
E35018	Raystar125 pole mount bracket
E36013	Raystar125 antenna conversion cable

NAVIGATION AIDS ACCESSORIES	
E32051	Flush-mount kit (RC435)

SUNLIGHT VIEWABLE MARINE DISPLAY ACCESSORIES	
R08174	VGA cable – 5m
E06021	DVI-D cable – 5m
R08183	G170 suncover
R08184	G190 suncover

SOFTWARE ACCESSORIES	
E85001	SeaTalk/NMEA/PC interface box
E85003	Audio/video junction box
E05010	Black USB keypad bezel kit
E05012	Trunnion-mount kit (USB keypad)
E86001	PC serial cable
E86008	C-Map USB chart reader
E86023	hsb² - PC kit hardware
E83041	RayTech RNS V6 – upgrade from V5

INSTRUMENT ACCESSORIES	
A25003-P	ST60+ Flush-mount kit
A22004-P	ST60+ suncover (standard)
A22005-P	ST60+ suncover (flush-mount)
A28042	50 metre extension cable (ST60+ wind transducer)
D284	ST40/ST60+ 1m extension cable
D285	ST40/ST60+ 3m extension cable
D286	ST40/ST60+ 5m extension cable
D287	ST40/ST60+ 9m extension cable
D288	ST40/ST60+ 20m extension cable
E25009	Trunnion-mount kit (ST60+)
E25024	Control unit mounting bracket (ST40)
E25027	Suncover (ST40)

AUTOPILOT ACCESSORIES	
A18097	ST8002 suncover (surface mount)
E12102	Smart heading sensor (gyro compass system)
D003	Pushrod extension – 25mm (1")
D004	Pushrod extension – 51mm (2")
D005	Pushrod extension – 76mm (3")
D006	Pushrod extension – 102mm (4")
D007	Pushrod extension – 127mm (5")
D008	Pushrod extension – 153mm (6")
D009	Tiller bracket – 25mm (1")
D010	Tiller bracket – 51mm (2")
D011	Tiller bracket – 76mm (3")
D159	Tiller bracket – 102mm (4")
D160	Tiller bracket – 127mm (5")
D031	Cantilever socket
D026	Pedestal socket – 38mm (1.5")
D027	Pedestal socket – 51mm (2")
D028	Pedestal socket – 64mm (2.5")
D029	Pedestal socket – 76mm (3")
D030	Pedestal socket – 89mm (3.5")
D002	Mounting socket (pack of 5)
D014	Small thread tiller pin (pack of 5)
D001	Tiller pin (pack of 5)
D021	Long thread tiller pin (pack of 5)

COMMUNICATION ACCESSORIES	
E46015	3m speaker extension cable (Ray215E)
E46018	5m extension cable (Ray215E)
E46023	Flush-mount kit (Ray215E)
M95995	Flush-mount kit (Ray430) (with trim ring)
E46038	Type D power adaptor - UK (Ray101E)
E45011	3m extension cable (Ray240E)
E45012	5m extension cable (Ray240E)
E45013	10m extension cable (Ray240E)
E45014	Bulkhead mounting kit (Ray240E)
E46034	Flush-mount kit (Ray54E)
R49134	Power cable (Ray240E)

FISHFINDER ACCESSORIES	
E66068	Flush-mount kit (DS500X)
E32051	Flush-mount kit (DS600X)
E66070	Transducer adaptor cable (required to connect DS500X/DS600X to all fishfinder transducer options
E66066	Transducer adaptor cable (DSM/hsb²)

A SERIES ACCESSORIES	
E36015	A65 network cable – 8.5m
E36016	A65 network cable – 15m
E36017	A65 flush mount kit
R38108	A65 suncover
R38109	A65 black plastic rear mount frame
R69086	A65 network cable – 3.5m

SATELLITE STV ACCESSORIES	
E96007	Power/data cable ACU to SAT – 30m
E96008	RF cable - 30m

CAMERA ACCESSORIES	
E06017	Camera extension cable – 5m
E06018	Camera extension cable – 15m
R08200	CCTV suncover
R08202	CCTV adaptor cable

Worldwide Warranty

In order to ensure that the product continues to operate efficiently and reliably, we recommend that, before using the product, the customer carefully reads the Owner's Handbook and follows the advice on the safe and correct operation and use of the product. We recommend that the Raymarine product, is installed and commissioned by a Raymarine certified installer. Installation or commissioning by persons other than a Raymarine certified installer may invalidate the warranty.

The Raymarine warranty terms and conditions as described below do not affect the customer's legal rights and complies with EU Directive 1999/44/EC.

1. Product warranty

1.1 Raymarine warrants each new product to be of good materials and workmanship. Raymarine, or its approved agents, will repair or exchange under warranty any parts or product proven to be defective in material or workmanship under normal use, for a period of 2 years (24 months) from date of sale to end user, subject to the limits contained in this warranty document.

1.2 The Raymarine warranty covers the parts and labour associated with any warranty repair as described above, provided that the product is returned to Raymarine or one of its approved agents.

1.3 Raymarine reserve the right to replace under warranty, not repair, certain Raymarine products subject to the limitations below, provided that they are returned to the nearest Raymarine National Distributor. For details of such products refer to the internet at **www.raymarine.com** or contact your nearest Raymarine National Distributor.

2. Onboard warranty

2.1 In addition to the Product warranty cover as described above, Raymarine will, authorise onboard warranty service by the nearest Raymarine approved service agent, subject to the maximum mileage and other limits referred to in paragraph 4.12 below, on products, where proof of installation, and commissioned by Raymarine certified installers, can be shown.

2.2 The warranty provides for onboard repair or exchange of the product, by Raymarine or its approved service agents, for a period of 2 years (24 months), subject to the limits contained in this warranty document. In the case of a product installed, by a Raymarine certified OEM installer, on a new boat prior to the sale of the boat to the customer, the 2-year period will begin on the date of the sale of the boat to the customer. In the case of a product installed, by a Raymarine certified installer, on a boat already in the possession of the customer, the 2-year period will begin on the date of the commissioning of the installed product by a Raymarine approved installer.

2.3 Certain Raymarine products are not covered by onboard warranty unless the products are pre-registered and onboard warranty is purchased from the Raymarine certified installer. For details of such products refer to the internet at **www.raymarine.com** or contact your nearest Raymarine National Distributor.

2.4 The Purchaseable onboard warranty is subject to the limitations below.

3. Obtaining warranty service

3.1 In the event of warranty service being required, the customer should contact Raymarine Technical Support or the nearest Raymarine approved service agent – the contact details of Raymarine Technical Support and a full list of the names and details of worldwide service agents are available on the Internet at **www.raymarine.com** and in the Owner's Handbook.

3.2 In cases where the customer is requesting a warranty service and a Raymarine certified installer has not installed the product; i.e. **Product warranty**, the affected product must be returned to the customer's local Raymarine approved service agent or direct to Raymarine, with:

3.2.1 proof of purchase showing the date of purchase and the name of the supplier of the product; **and**

3.2.2 the serial number of the affected product; **or**

3.2.3 a warranty card completed by the product supplier (which will contain the information required by paragraphs 3.2.1 and 3.2.2).

Subject to the limitations above, the product will be repaired or replaced (at the discretion of Raymarine or a Raymarine service agent) at no further cost and promptly returned to the customer.

3.3 In cases where the customer is making a warranty claim and the product has been installed and commissioned by a Raymarine certified installer, (boat builder, installer, dealer etc.) i.e. **Onboard warranty**, the nearest Raymarine approved service agent should be contacted and onboard service requested (which will be subject to the limits referred to in paragraph 4.12 below). Before the onboard warranty service is performed, the customer must have available:

3.3.1 proof of purchase showing the date of purchase and the name of the supplier of the product; **and**

3.3.2 the serial number of the affected product; **and**

3.3.3 proof of installation of the product by a Raymarine certified installer; **or**

3.3.4 a warranty card completed and stamped by the installing agent (which will contain the information required by paragraphs 3.3.1 to 3.3.3).

3.4 In cases where onboard warranty has been purchased – as described in 2.3; the nearest Raymarine approved service agent should be contacted and onboard service requested, information detailed in 3.3.1 and 3.3.2 is required. Onboard warranty service will only be performed if the product serial number confirms that the onboard warranty service cover has been purchased and is valid.

4. Warranty limitations

4.1 Raymarine warranty policy does not apply to any product that has been subjected to accident, abuse or misuse, shipping damage, alterations, corrosion, incorrect and/or non-authorised service, or products on which the serial number has been altered, mutilated or removed.

4.2 Certain products do not carry the onboard warranty, as described in section above, unless the onboard warranty cover is purchased at the time of installation. The purchaseable onboard warranty is only available on products purchased in specific territories, for further details refer to the internet at **www.raymarine.com** or contact your nearest Raymarine National Distributor.

4.3 Products purchased outside the country of installation will not be covered by onboard warranty.

4.4 Raymarine assumes no responsibility for damage incurred during installation or as a result of improper installation.

4.5 This warranty does not cover routine system checkouts, alignment/calibration, sea-trials or commissioning, unless required by replacement of part(s) in the area being aligned.

4.6 Raymarine assumes no responsibility for damage caused by or to other equipment, systems or components occasioned by improper or unauthorised connection, or use, of the product.

4.7 Consumable items, including, but not limited to: fuses, batteries, drive belts, radar mixer diodes, snap-in impeller carriers, impellers, impeller bearings, and impeller shafts are specifically excluded from this warranty. A complete list of the consumable items relating to each product can be found in the Owner's Handbook and/or on the internet at **www.raymarine.com**.

4.8 All costs associated with transducer replacement, other than the cost of the transducer itself, are specifically excluded from this warranty.

4.9 Overtime/premium labour portion of services outside of normal working hours is not covered by this warranty.

4.10 If repairs are necessary under the warranty, the affected product must be forwarded to a Raymarine facility or a Raymarine approved service agent, at the owner's expense.

4.11 The Raymarine warranty does not cover any differences in material, colouring or size between those alluded to in corporate advertising, literature or published on the internet, which are not specifically objected to at the time of delivery.

4.12 Travel costs other than auto mileage, tolls and two (2) hours travel time, are specifically excluded from the warranty on all products. Costs, which are excluded from the coverage of this warranty, include but are not limited to: taxi fares, launch fees, aircraft rental, subsistence, customs, shipping and communication charges etc.

4.13 Neither Raymarine nor a Raymarine service agent shall be liable for any incidental, indirect, consequential or special (including punitive or multiple) damages, nor shall Raymarine or a Raymarine service agent be liable for any loss of profit, business, contracts, opportunity, goodwill or other similar loss. The liability of Raymarine or a Raymarine service agent to a customer under this warranty, whether for breach of contract, tort, breach of statutory duty or otherwise, shall not exceed US$1,000,000. Nothing in this paragraph 4.13 shall limit the liability of Raymarine or a Raymarine service agent in respect of death or personal injury caused by its negligence, fraud or any other liability which by law, cannot be excluded or limited.

4.14 All Raymarine products sold or provided hereunder are merely aids to navigation. It is the responsibility of the user to exercise discretion and proper navigational skill independent of any Raymarine product.

4.15 The above statements do not apply to products purchased through Raymarine Inc, based in the USA, which will be subject to different terms and conditions. These are available on request or refer to the internet at **www.raymarine.com.**

Standard Raymarine warranty.

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The technical and graphical information contained in this catalogue, to the best of our knowledge, was correct as it went to press. However, the Raymarine policy of continuous improvement and updating may change product specifications without prior notice. Therefore, unavoidable differences between the product and this catalogue may occur from time to time, for which liability cannot be accepted by Raymarine.

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Product Wish List

PRODUCT	PART NUMBER

Notes

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